SPATIAL AND TEMPORAL DISTRIBUTION OF BENTHIC MACROINVERTEBRATES AND SEDIMENTS COLLECTED IN THE VICINITY OF THE J. H. CAMPBELL PLANT, EASTERN LAKE MICHIGAN, 1978

By

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CONTENTS

INTRODUCTION

Expanding requirements for energy combined with efforts to protect our environment have resulted in increased attention to the study of organisms in the vicinity of power plants utilizing water from lakes or rivers for cooling purposes. Public law requires the operator to demonstrate through ecological surveys that there have been no effects associated with heated-water discharges on the propagation of a balanced, indigenous population of shellfish, fish and wildlife in and on the body of water into which the discharge is to be made. This report is concerned with studies of the benthos, while a companion study (Jude et al. 1979) deals with larval, juvenile and adult fish.

Proposed expansion of the J. H. Campbell Plant with the addition of Unit 3, which is designed to draw cooling water from approximately 12 m and discharge heated water at about 6 m, prompted a study of organisms which might be affected. At present, water from Lake Michigan is drawn through Pigeon Lake for cooling purposes for the operation of Units 1 and 2 at the Campbell Plant. Heated water from Units 1 and 2 is shunted through a canal and discharged at the shoreline of Lake Michigan. In a report (Consumer's Power Company 1975), Beak Consultants Inc. concluded that while some differences between treatment and reference areas have been documented near the Campbell Plant, studies completed up to 1974 indicated that the existing shoreline thermal discharge has not had any "appreciable harm to the benthic community". A subsequent survey conducted by Jude et al. (1978) confirmed earlier conclusions made by Beak Inc. The purpose of this report is to provide preoperational data on benthos and related sediments collected during 1978 and to determine if differences exist in species composition and densities between designated

treatment and reference areas associated with addition of Unit 3 to the J. H. Campbell Plant facilities.

Benthos are particularly useful indicators of environmental changes since most species are thought to remain in a localized area throughout the majority of their aquatic lives. Exceptions occur for some benthic forms which may actively enter the water column and be transported by lake currents (Wiley and Mozley 1978). Nevertheless, it appears generally that benthos are fairly stationary compared with phytoplankton, zooplankton or fish.

Environmental factors which may influence the density and composition of benthic populations include waves (storms), seiching, alongshore and rip currents, temperature, sediment type, degree of sedimentation, enrichment, topography of lake bottom and seasonal variations such as harshness of winters or summers. All of the above factors except sediment type are presumed to be operating similarly in the Campbell survey area and thereby constitute ambient conditions. Benthic populations sampled at a particular depth and time are expected to respond to changing ambient conditions equally regardless of their location in the survey area. In a similar manner, localized benthic populations may be expected to exhibit a response to altered conditions in one area compared with other areas where similar ambient conditions are expected, thereby enabling detection of these changes through comparison of population size or composition over time.

Previous studies by Truchen (1970) and Consumers Power Company (1975) provide comparative preoperational data on the benthic macroinvertebrates (macrobenthos) in the immediate vicinity of the Campbell Plant. Surveys by Powers and Robertson (1965), Robertson and Alley (1966), Hiltunen (1967), Alley (1968) and Alley and Mozley (1975) provide a general structural review of

benthos from the eastern shoreline of Lake Michigan. However, the pilot study conducted during June 1977 by Jude et al. (1978), provides the most directly comparable benthic data near the Campbell plant.

METHODS

Benthic macroinvertebrate and sediment samples were collectd on 18 April, 20 July and 17 October 1978 in the vicinity of the Campbell Plant, eastern Lake Michigan. Ninety samples were collected for benthos and sediments during each month from the University of Michigan's R/V Mysis, yielding a yearly total of 270 samples for each parameter. No samples were lost due to breakage or spillage.

The survey design in 1978 near the Campbell Plant consisted of 30 stations along six transects in three regions (Fig. 1). Each of the six transects was situated perpendicular to the shoreline with five stations located at 3, 6, 9, 12 and 15 m, designated as station numbers 1-5, respectively. Three transects were located north and three south of the present Unit 1 and 2 discharge at 0.25 km (north 1 and south 1), 1.0 km (north 2 and south 2) and 5.0 km (north 3 and south 3). The inner region was composed of transects north 1 and south 1, the intermediate region of north 2 and south 2 and the outer region of north 3 and south 3. The inner region represented the treatment area near the present onshore thermal discharge. The intermediate and outer regions represented reference areas located at previously mentioned distances from the Campbell Plant. Due to construction activities in the inner region during the course of the 1978 survey, it was necessary to relocate transects north 1 and south 1 at 0.32 km distant from the present discharge canal for samples taken during July and October.

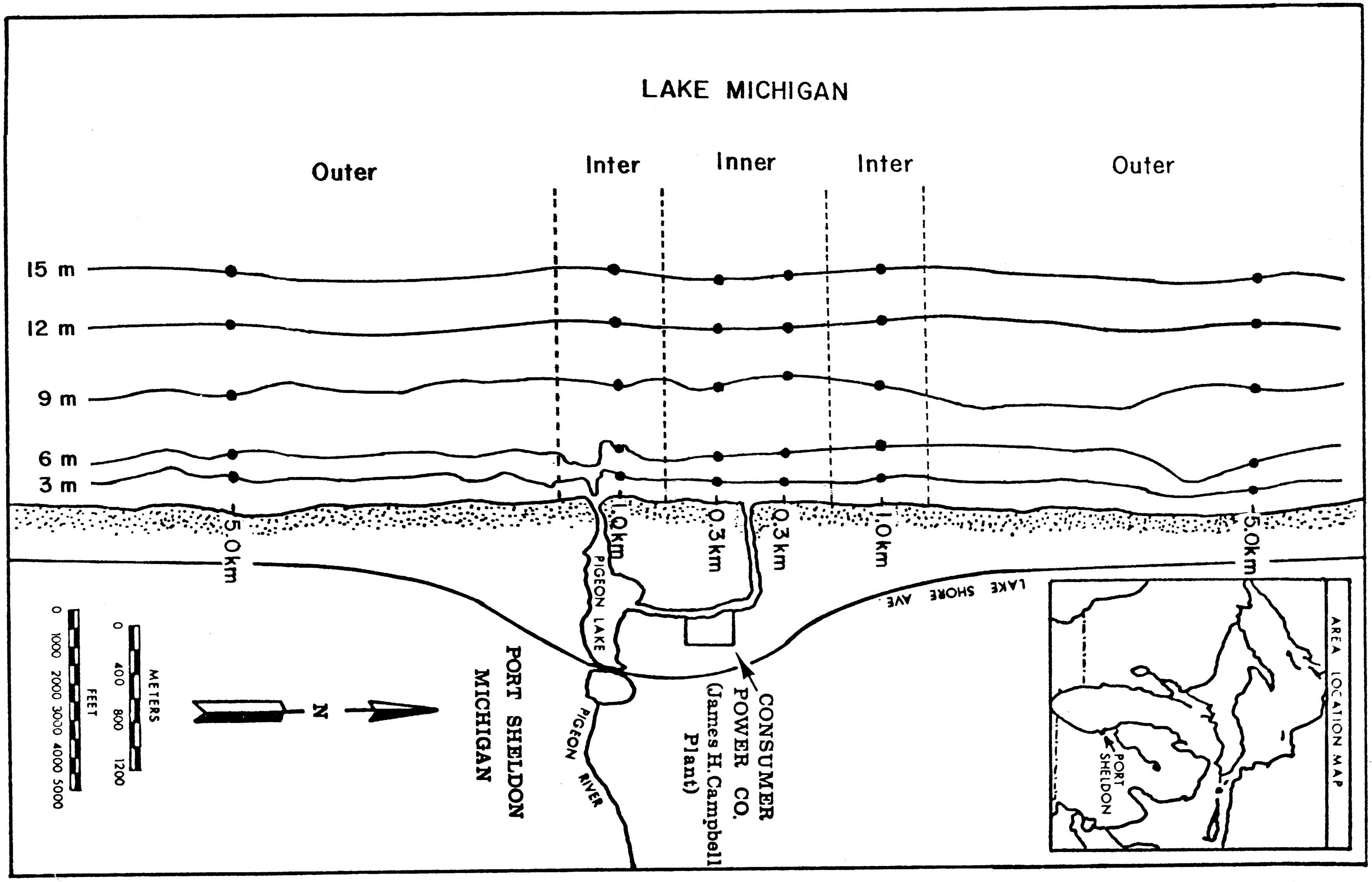


Fig. 1. Location of stations (solid dots), regions [inner = treatment area near present thermal discharge, intermediate (inter) and outer = reference areas] and depths used in the 1978 benthos sample design in eastern Lake Michigan near the J. H. Campbell Plant.

The survey design above was established to test for preoperational differences in benthic macroinvertebrate distributions during 1978 along inner, intermediate and outer regions at 3, 6, 9, 12 and 15 m near the Campbell Plant. In addition, the survey design will test for future effects of intake/discharge structures currently under construction. Application of the present survey design to preoperational and operational data will determine effects with respect to regional comparisons at each depth and month across years. Further discussion of the survey design is considered in the statistical section to follow.

Samples were collected using a triplex (three chambered) ponar grab sampler (Mozley and Chapelsky 1973). One side chamber of the ponar grab was used to estimate numbers of benthic macroinvertebrates occurring in a square meter. Each chamber of the ponar grab is equivalent to 0.0165 m^2. A conversion factor of 60.60 was used to convert numbers of animals present in each grab to number m^{-2}. Contents from the remaining two chambers of the ponar were emptied into a tub and mixed, and approximately 30 g of sediment removed for sediment analysis. Three replicates (A-C) were collected to estimate benthic populations and sediments within any particular depth and region during each month sampled.

The portion of the ponar grab used to estimate benthic macroinvertebrates was placed in a "funnel-shaped hopper" (see Mozley 1975 for details) aboard the R/V Mysis. Benthic samples were then washed through a 0.35-mm mesh net to concentrate animals and remove excess sediment and debris. Concentrated samples were stored in externally and internally labelled 1.5-pint Mason jars, preserved with carbonate-buffered, 4% formaldehyde solution and returned to the Great Lakes Research Division benthos laboratory for sorting and identification.

Sorting and initial identification of organisms were performed using dissecting scopes (3-30X). Specimens unidentified at the genus/species level (Chironomidae, Naididae and Tubificidae) were mounted on slides with Amman's lactophenol clearing medium and identified using compound scopes (40-1000X). Chironomids have been identified from a variety of keys. Most chironomid taxa identified from 1977 and 1978 have been compared to similar specimens collected at the D. C. Cook Plant, southeastern Lake Michigan. Larval, pupal and adult chironomid associations at the D. C. Cook Plant have been reviewed by Mozley (1975). Initial generic identification of chironomids was determined using an unpublished trial key to the chironomids (A. L. Hamilton and O. A. Saether, personal communication, Freshwater Institute, Winnipeg, Manitoba, Canada and Zoological Museum and Department of Morphology, Systematics and Animal Ecology, University of Bergen, Bergen, Norway). In cases where species have been determined for chironomid genera, "cf." refers to uncertain larval identification at the species level. Although most species designations concur with reared material from the D. C. Cook Plant, southeastern Lake Michigan, which are maintained in the Great Lakes Research Division benthos laboratory's permanent collection, none of the larvae from the J. H. Campbell Plant have been reared and therefore require the uncertainty designator "cf." The designator "gr." which refers to a "group" of species undeterminable from larvae has been associated with the genera Polypedilum and Chironomus. Morphology and taxonomy of other chironomid genera and species have been determined from the following references: Saether (1969, 1971, 1973, 1975, 1976 and 1977), Curry (1958), Lenz (1954), Roback (1957), Jackson (1977), Soponis (1977), Beck and Beck (1969) and Hirvenoja (1973).

Naidids and tubificids have been identified using an unpublished key to aquatic oligochaetes of the Great Lakes (J. K. Hiltunen, personal

communication, Great Lakes Fishery Laboratory, U.S. Fish and Wildlife Service, Ann Arbor, Mich.). Gastropods and pelecypods were identified using a key to molluscs of the Great Lakes being prepared at the Great Lakes Research Division (G. Mackie, T. Zdeba and D. White, personal communication, University of Michigan, Ann Arbor, Mich.).

While aboard the R/V Mysis, sediments were stored in sealed plastic bags bearing external labels. Standard mechanical sieving of sediment samples was performed by the Great Lakes Research Division sediment laboratory. Folk, Inman and moment measure statistics were computed for each sample collected. Data have been expressed in terms of phi units following Krumbein (1938). Seibel et al. (1975), Upchurch (1969) and Cockley and Beal (1972) indicated that moment measure statistics were the "preferred method for deriving sediment textural parameters." Two moment measure statistics, mean grain size and standard deviation of the mean grain size, have been used in this report. Standard deviation has been used as a measure of sorting, following Seibel et al. (1975). In addition to moment measure statistics, percentage of sediments occurring within any given sediment grain size based on units of phi has been included in this report. Description of sediment grain sizes followed that of Seibel (1975), who adapted his from the standard Wentworth scale (Table 1).

Benthic and sediment data were recorded on data sheets and stored in permanent internal computer files in the Michigan Interactive Data System (MIDAS) on the AMDAHL 470V/7 computer at the University of Michigan. Statistical analysis of the data was performed using programs within MIDAS, the biomedical analysis of variance program (BMD08) and programs internal to the sediment laboratory.

TABLE 1. Wentworth grade scale adapted from Seibel (1975). Phi unit = $\log_2$ (diameter of particle in mm).

Phi unit	Grade	mm	Microns	
<-3		>8.00	>8000	GRAVEL
	Coarse gravel			
-3		8.00	8000	
	Fine gravel			
-2		4.00	4000	
	Very fine gravel			
-1		2.00	2000	
	Very coarse sand			SAND
0		1.00	1000	
	Coarse sand			
1		0.50	500	
	Medium sand			
2		0.25	250	
	Fine sand			
3		0.125	125	
	Very fine sand			
4		0.0625	62.5	
	Coarse silt			SILT
5		0.0313	31.3	
	Medium silt			
6		0.0156	15.6	
	Fine silt			
7		0.0078	7.8	
	Very fine silt			
8		0.00391	3.91	
	Coarse clay			CLAY
9		0.00195	1.95	
	Medium clay			
10		0.00098	0.98	
	Fine clay			

RESULTS AND DISCUSSION

SPATIAL AND TEMPORAL DISTRIBUTION OF BENTHIC MACROINVERTEBRATES

Total Animals

In 1977, 88 taxa were identified from the Campbell Plant area (Jude, et al. 1978). The 1978 survey near the J. H. Campbell Plant resulted in the collection of 80 identified taxa. Based on 1977 and 1978 surveys, macroinvertebrates in the vicinity of the J. H. Campbell Plant were represented by a combined total 98 benthic forms (Table 2). Based on the 90 samples collected in each region during 1978, the number of identified taxa occcurring in each region was similar with the inner and outer regions represented by 69 forms and the intermediate region by 66. Taxonomic comparisons between the 1977 and 1978 surveys will be made within each major taxonomic group (i.e., *Pontoporeia hoyi*, Chironomidae, Naididae, Tubificidae, *Stylodrilus heringianus*, *Pisidium*, *Sphaerium* and Gastropoda).

Mean densities of total animals in all three regions were generally lowest in April, attained maximum density in July and decreased in October samples (Fig. 2). While the lowest mean density of total animals was observed in April at 3 m in the outer region (0 m^{-2}), greatest mean density occurred in July at 12 and 15 m in all regions (10,000-15,000 m^{-2}) (Appendixes 1 and 5). Regional mean densities were very similar for total animals in any particular month at 9, 12 and 15 m. At 3 and 6 m, regional total animal mean densities were similar during most months, except July at 3 m and October at 6 m where differences were largely due to increased chironomid abundance and will be discussed in the appropriate subsection.

TABLE 2. Benthic macroinvertebrates identified from samples collected during 1977 and 1978 from 3 to 25 m near the J. H. Campbell Plant, eastern Lake Michigan.

Taxa	Taxa
Coelenterata	Hirudinea
Hydrozoa	Rhyncobdellida
Hydridae	Glossiphoniidae
Hydra sp.	*Helobdella stagnalis*
Platyhelminthes	Other Hirudinea spp.
Turbellaria spp.	Arthropoda
Annelida	Acari
Oligochaeta	Hydracarina spp.
Enchytraeidae spp.	Crustacea
Lumbriculidae	Amphipoda
Stylodrilus heringianus	Gammaridae
Naididae	*Gammarus* sp.
Amphichaeta leydigii	Haustoriidae
Arcteonais lomondi	*Pontoporeia hoyi*
Chaetogaster diaphanus	Mysidacea
Chaetogaster diastrophus	Mysidae
Chaetogaster setosus	*Mysis relicta*
Dero sp. (?*digitata*)	Insecta
Nais bretscheri	Diptera
Nais communis	Chironomidae
Nais elinguis	Chironominae
Nais simplex	Chironomini
Nais variabilis	*Chironomus fluviatilis*-gr.
Paranais litoralis	*Chironomus halophilus*-gr.
Paranais simplex	*Cladopelma* sp.
Piguetiella michiganensis	*Cryptochironomus* sp. 1
Pristina foreli	*Cryptochironomus* sp. 2
Pristina osborni	*Cryptochironomus* sp. 3
Stylaria lacustris	*Cryptochironomus* cf. *rolli*
Uncinais uncinata	*Parachironomus* cf. *abortivus*
Vejdovskyella intermedia	*Paracladopelma* cf. *undine*
Tubificidae	*Paracladopelma* cf. *winnelli*
Aulodrilus limnobius	*Paratendipes* sp.
Limnodrilus angustipenis	*Polypedilum* cf. *fallax*-gr.
Limnodrilus claparedeianus	*Polypedilum* cf. *halterale*
Limnodrilus hoffmeisteri	*Polypedilum* cf. *scalaenum*
Limnodrilus profundicola	*Polypedilum* sp. 2
Limnodrilus spiralis	*Robackia* cf. *demeijerei*
Limnodrilus udekemianus	*Saetheria* cf. *tylus*
Peloscolex freyi	Tanytarsini
Peloscolex superiorensis	*Cladotanytarsus* sp.
Potamothrix moldaviensis	*Micropsectra* sp.
Potamothrix vejdovskyi	*Tanytarsus* sp.
Rhyacodrilus coccineus	Orthocladiinae
	Cricotopus sp.
	Heterotrissocladius cf. *changi*

TABLE 2. Continued.

Taxa
Heterotrissocladius cf. *oliveri*
Hydrobaenus sp.
Nanocladius sp.
Orthocladius (*Orthocladius*) sp. 1
Orthocladius (*Orthocladius*) sp. 2
Orthocladius (*Euorthocladius*) sp.
Parakiefferiella sp.
Psectrocladius sp.
Diamesinae
Monodiamesa cf. *tuberculata*
Potthastia cf. *longimanus*
Tanypodinae
Procladius sp.
Trichoptera
Molannidae
Molanna sp.
Mollusca
Gastropoda
Ctenobranchiata
Hydrobiidae
Amnicola sp.
Bythinia tentaculata
Valvatidae
Valvata sincera
Pulmonata
Lymnaeidae
Lymnaea sp.
Pelecypoda
Heterodonata
Sphaeriidae
Pisidium adamsi
Pisidium casertanum
Pisidium compressum
Pisidium conventus
Pisidium fallax
Pisidium ferrugineum
Pisidium henslowanum
Pisidium idahoense
Pisidium lilljeborgi
Pisidium milium
Pisidium nitidum f. *nitidum*
Pisidium nitidum f. *pauperculum*
Pisidium subtruncatum
Pisidium supinum
Pisidium variabile
Pisidium walkeri
Sphaerium nitidum
Sphaerium striatinum
Sphaerium transversum

The 1978 monthly depth distribution pattern for total animals near the Campbell Plant corresponded with the total animal depth distribution observed during June 1977 (Jude et al. 1978) (Fig. 3). However, at 3 and 6 m in April 1978 total animal density was quite reduced, differing particularly with the depth distribution pattern of total animals present during July and October 1978 at 3 and 6 m.

In 1977 (Jude et al. 1978), a rationale for observed benthic depth distribution patterns was presented. Results from the 1978 survey tended to confirm the 1977 hypothesis of a physically controlled, unstable habitat at 3 and 6 m, and an increasingly stable environment at 9, 12 and 15 m. This was particularly evident during April at 3 and 6 m and October at 3 m when storms, increased wave activity and spring ice break-up may have caused decreased abundance of animals.

Expressed as a percentage of total animals, the most prevalent major taxonomic form at 3 m was chironomids in all regions and months except the intermediate region in April and the intermediate and outer regions in October, when turbellarians were predominant (Table 3). At 6 m chironomids and naidids were most prevalent in all regions and months except at the intermediate region in April, when again turbellarians constituted a large percentage of the animals collected. While prevalence of chironomids and naidids was expected based on the June 1977 survey (Jude et al. 1978), occurrence of large percentages of turbellarians was not. There appears to be no literature regarding Great Lakes turbellarian abundances or ecology; therefore it is difficult to interpret the nature of their populations.

From 9 to 15 m, percent occurrence of major taxonomic groups varied in a complex manner through depths sampled in each region and in each month. The

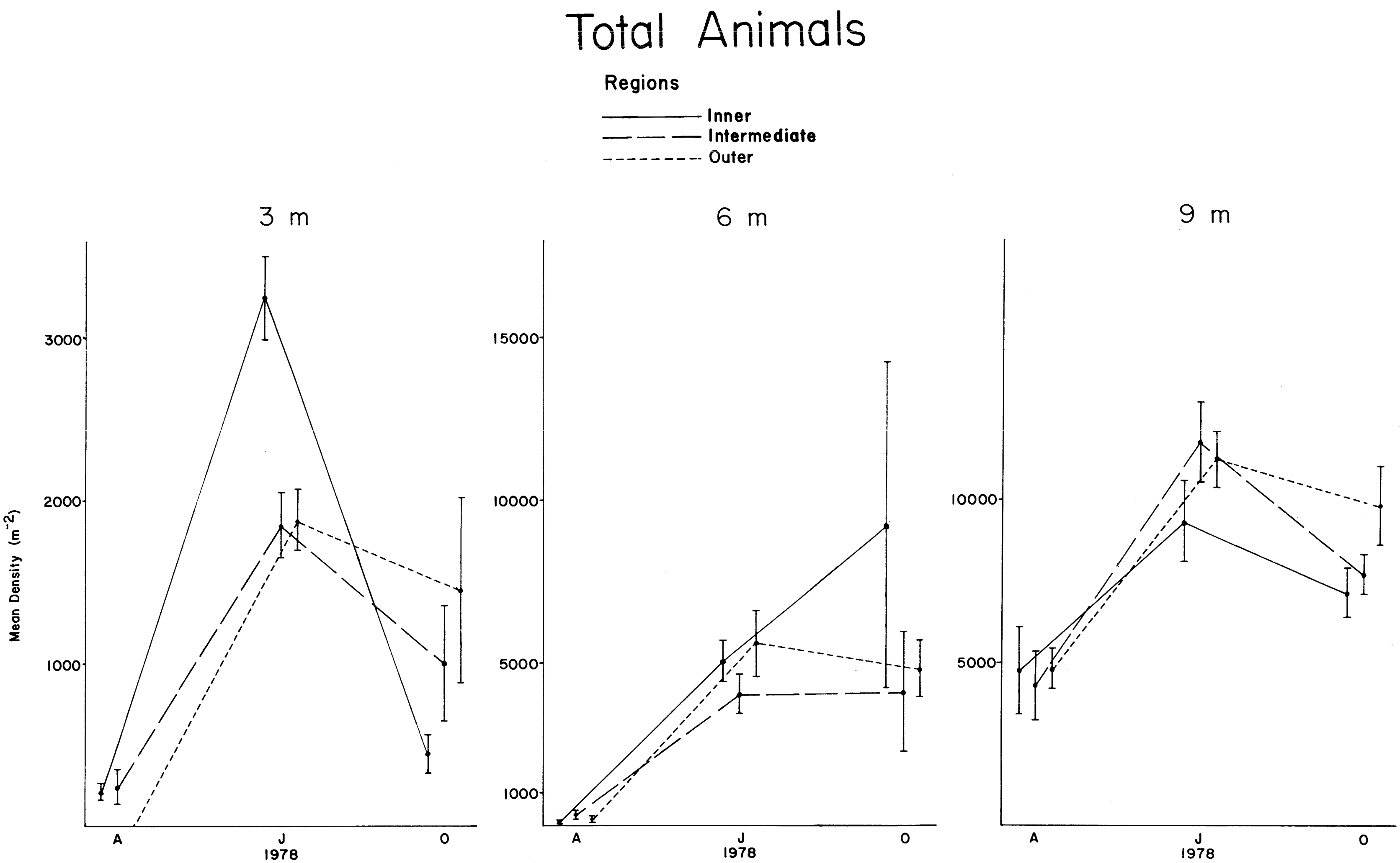


Fig. 2. Regional mean densities (number m^{-2}) of total animals collected in April, July and October 1978 from eastern Lake Michigan at 3-15 m near the J. H. Campbell Plant. Standard error denoted by vertical bar (n = 6). Inner region = treatment area near present thermal discharge, intermediate and outer regions = reference areas.

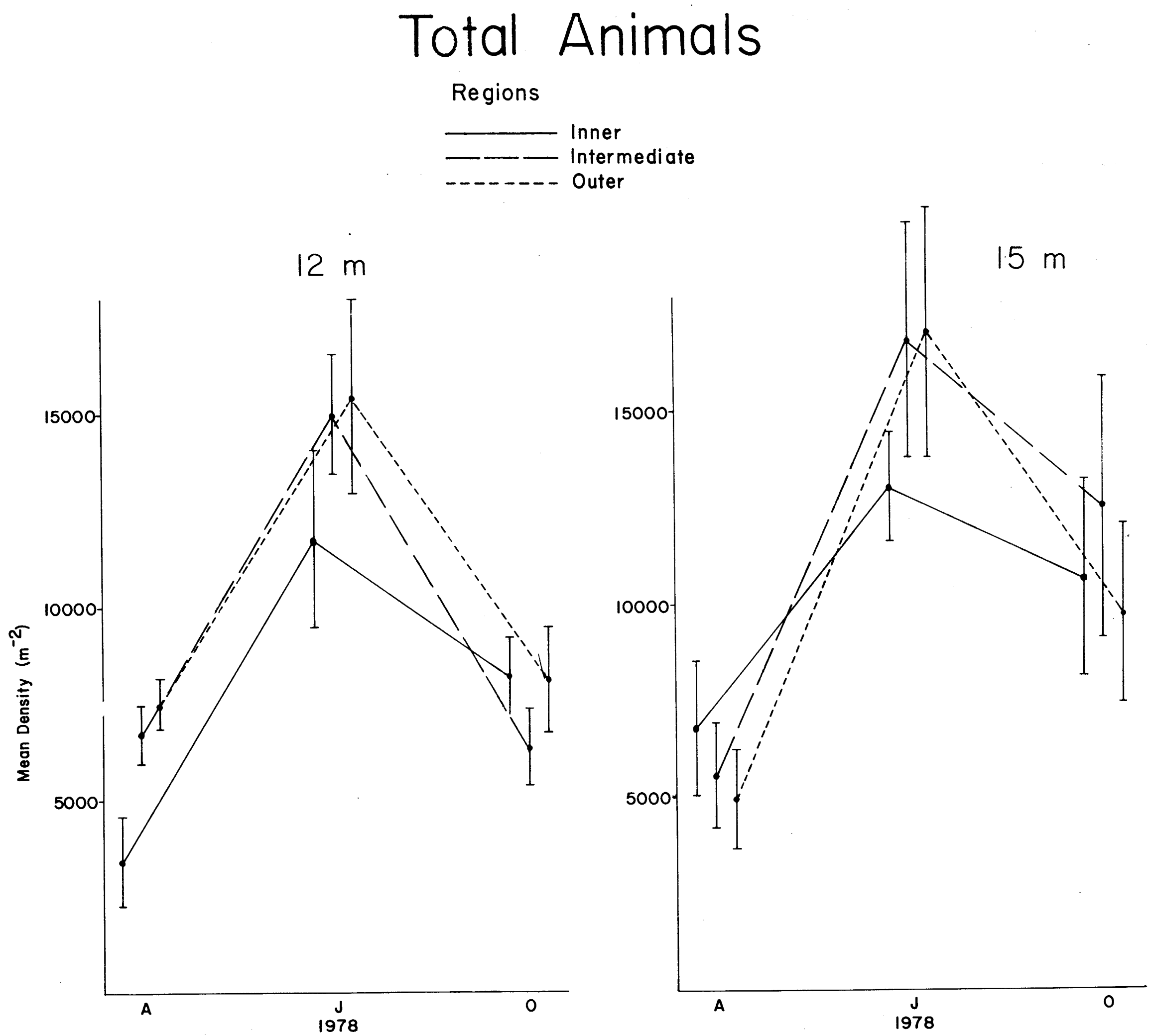


Fig. 2. Continued.

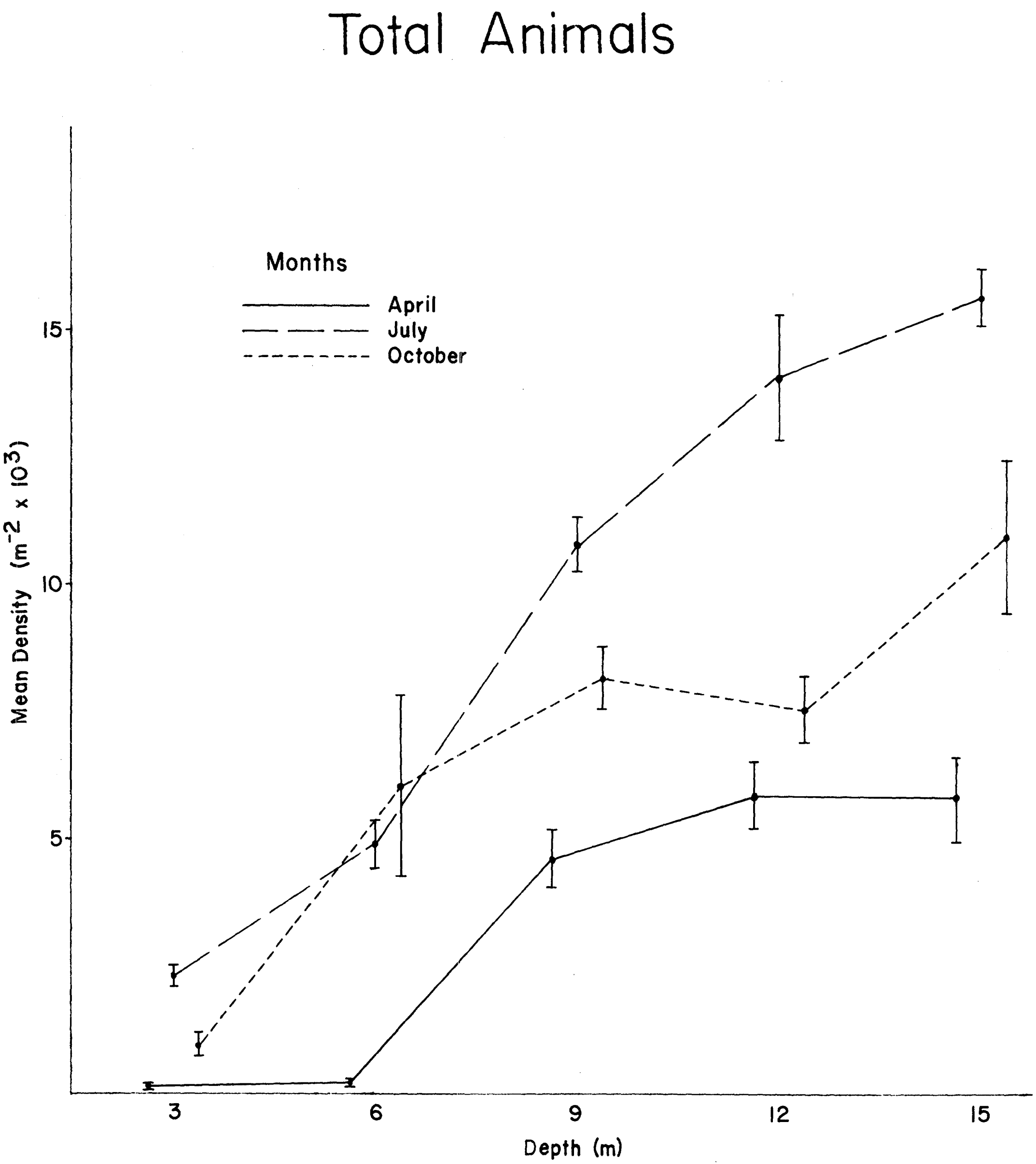


Fig. 3. Mean density (number m^{-2}) of total animals in April, July and October 1978 at 3-15 m in eastern Lake Michigan near the J. H. Campbell Plant. Standard error denoted by vertical bar (n = 18).

TABLE 3. Percentage occurrence of major taxonomic groups collected in 1978 at 3-15 m among inner (treatment area near present thermal discharge), intermediate and outer (reference areas) regions in the vicinity of the J. H. Campbell Plant, eastern Lake Michigan. Percentages expressed in terms of total animals.

	April														
	INNER					INTERMEDIATE					OUTER				
Taxa	3 m	6 m	9 m	12 m	15 m	3 m	6 m	9 m	12 m	15 m	3 m	6 m	9 m	12 m	15 m
Chironomidae	85.8	100.0	44.8	40.9	17.5	45.9	61.1	61.4	59.0	23.5		68.2	58.3	55.8	39.8
Naididae	4.7		6.3	9.2	4.0		2.8	6.3	4.2	7.9			4.0	16.0	5.3
Tubificidae			23.3	20.4	25.5	4.1		21.5	25.8	27.6		31.8	33.7	17.5	32.3
Enchytraeidae			0.2						0.4	0.4			0.2	0.1	
S. heringianus															
Oligochaeta	4.7		29.8	29.6	29.5	4.1	2.8	27.8	30.4	35.9		31.8	37.9	33.6	37.6
Pisidium			2.7	6.5	12.0		2.8	2.6	4.1	9.9			2.5	5.0	13.0
Sphaerium								0.2	0.1						0.8
Pelecypoda			2.7	6.5	12.0		2.8	2.8	4.2	9.9			2.5	5.0	13.8
Gastropoda			0.8	1.5	1.9				1.2	1.4			0.4	2.7	2.8
P. hoyi			21.8	21.6	38.8			7.9	5.1	28.7			0.8	2.8	5.5
Others	9.5				0.3	50.0	33.3			0.5					0.4

	July														
	INNER					INTERMEDIATE					OUTER				
Taxa	3 m	6 m	9 m	12 m	15 m	3 m	6 m	9 m	12 m	15 m	3 m	6 m	9 m	12 m	15 m
Chironomidae	84.8	60.9	32.8	23.8	6.9	98.4	63.7	37.0	18.3	14.3	100.0	55.5	41.3	25.7	7.1
Naididae	14.7	36.5	29.1	24.0	5.0		29.6	33.6	27.4	9.2		29.8	36.5	34.1	4.3
Tubificidae		0.4	13.4	3.6	1.9	0.5	3.7	13.8	8.4	6.5		12.3	10.9	7.9	4.6
Enchytraeidae															
S. heringianus			0.7		0.5				0.1	5.2			0.1	0.8	7.6
Oligochaeta	14.7	36.9	43.2	27.6	7.4	0.5	33.3	47.4	35.9	20.9		42.1	47.5	42.8	16.5
Pisidium		0.4	0.9	1.8	4.1		0.7	1.5	3.1	8.3		0.9	1.9	1.8	9.8
Sphaerium			0.1						0.1					0.2	0.2
Pelecypoda		0.4	1.0	1.8	4.1		0.7	1.5	3.2	8.3		0.9	1.9	2.0	10.0
Gastropoda			4.9	1.0	1.8		0.5	0.3	0.9	1.8		0.2	0.5	1.1	2.1
P. hoyi		1.6	17.7	45.0	79.7	1.1	1.7	13.2	41.4	54.3		1.3	8.2	28.2	63.8
Others	0.6	0.2	0.5	0.9	0.1			0.5	0.3	0.2			0.8	0.3	0.5

TABLE 3. Continued.

Taxa	October														
	INNER					INTERMEDIATE					OUTER				
	3 m	6 m	9 m	12 m	15 m	3 m	6 m	9 m	12 m	15 m	3 m	6 m	9 m	12 m	15 m
Chironomidae	90.9	97.9	38.6	24.3	5.0	32.3	91.9	49.0	28.7	3.8	15.3	67.5	42.2	19.6	7.2
Naididae		1.0	29.3	15.1	8.9		5.6	24.0	14.2	9.2	2.1	23.9	26.3	20.7	15.1
Tubificidae		0.3	18.2	24.9	18.4		1.2	16.0	29.0	21.7		5.0	16.1	31.1	17.6
Enchytraeidae			0.1	5.3	4.1				1.0	5.4			1.4	2.7	8.0
S. heringianus			0.3	0.1	9.6					18.8			0.1	0.1	11.2
Oligochaeta		1.3	47.9	45.4	41.0		6.8	40.0	44.2	55.1	2.1	28.9	43.9	54.6	51.9
Pisidium			2.8	4.6	8.5			2.1	6.2	7.4			1.2	2.9	8.0
Sphaerium					0.2			0.4		0.2			0.2		
Pelecypoda			2.8	4.6	8.7			2.5	6.2	7.6			1.4	2.9	8.0
Gastropoda			0.6	0.5	2.8				0.2	0.4				0.9	0.9
P. hoyi		0.2	7.3	18.4	36.6		0.5	7.3	13.7	26.8		1.1	4.1	11.1	22.4
Others	9.0	0.6	2.8	6.9	5.8	67.7	0.7	1.3	7.0	6.3	82.7	2.5	8.2	10.9	9.7

general percent distribution pattern in the 1978 survey data was one of chironomid percent occurrence decreasing at 9 m, naidid percent occurrence decreasing at 12 m, and *Pisidium*, *Stylodrilus heringianus* and particularly *Pontoporeia hoyi* percent occurrences increasing with depth at least to 15 m. This depth distribution pattern also was observed during the June 1977 survey (Jude et al. 1978).

Pontoporeia hoyi

P. hoyi was the fourth most frequently encountered major taxonomic group in 1978, occurring in 62% of 270 samples taken near the Campbell Plant (Table 4). Temporal and spatial distribution patterns of *P. hoyi* were similar among regions at any particular depth and month sampled in 1978 (Fig. 4). A direct relationship between density of *P. hoyi* and depth was

TABLE 4. Frequency of occurrence of major taxonomic groups among benthic samples (n = 270) collected during 1978 in eastern Lake Michigan near the J. H. Campbell Plant.

Taxa	%	Taxa	%
Chironomidae	95.2	Enchytraeidae	14.4
Oligochaeta	77.0	*S. heringianus*	13.3
Naididae	73.7	Hydracarina	9.3
Tubificidae	63.7	*Sphaerium*	5.6
P. hoyi	61.9	*Hydra*	5.6
Pisidium	54.4	Hirudinea	4.4
Turbellaria	32.9	*Gammarus*	0.4
Gastropoda	31.9	Samples with Animals	95.9

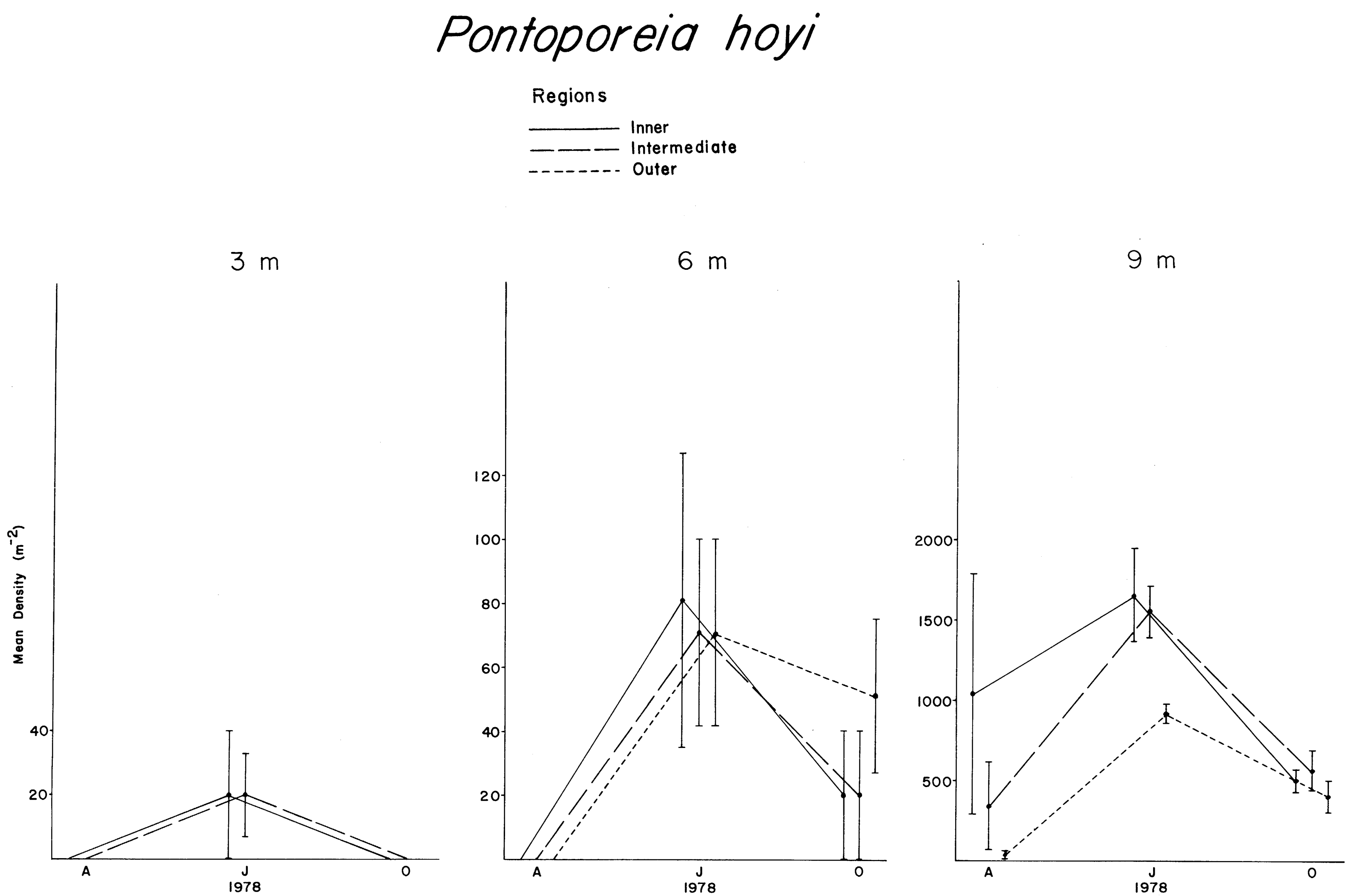
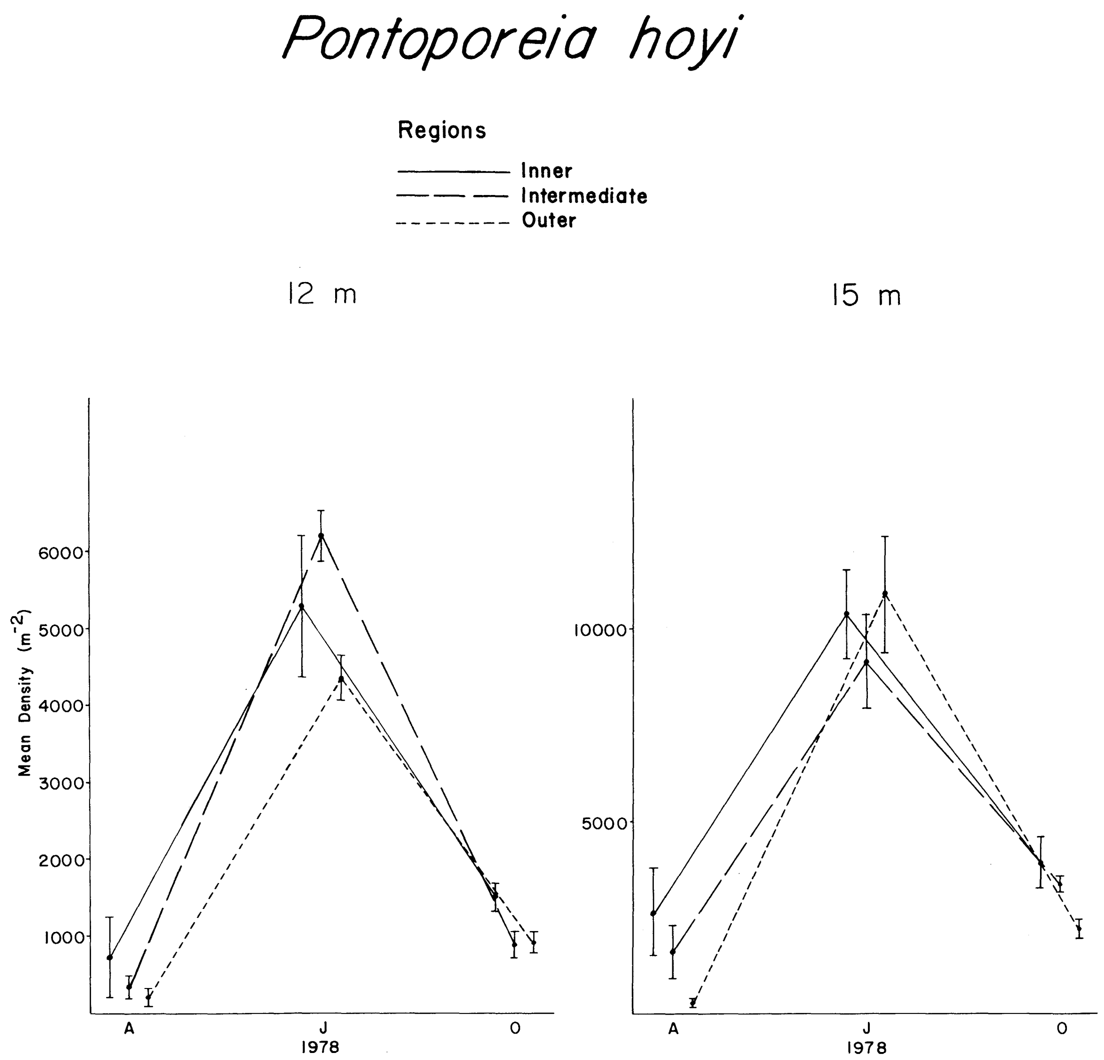


Fig. 4 . Regional mean densities (number m^{-2}) of P. hoyi collected in April, July and October 1978 from eastern Lake Michigan at 3-15 m near the J. H. Campbell Plant. Standard error denoted by vertical bar (n = 6). Inner region = treatment area near present thermal discharge, intermediate and outer regions = reference areas.



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observed (Fig. 4). Compared with P. hoyi regional mean densities at 3 and 6 m (0-80 m^{-2}) throughout the months sampled, abundance of P. hoyi at 9 m was considerably greater, ranging from approximately 500 to 1500 m^{-2} within the same time span. Maximum regional mean density of P. hoyi was observed at 12 m (4300-6200 m^{-2}) and 15 m (9100-10,900 m^{-2}) during July. However, P. hoyi mean densities at 12 and 15 m in July were approximately 5 to 12 times more numerous than those observed during April and 3 to 7 times more numerous than densities present in October. While there were obvious temporal P. hoyi density differences at any month or depth, there were no apparent mean density differences among regions as were present during June 1977 (Jude et al. 1978), particularly at 15 m.

Vascotto (1976) observed that newly released P. hoyi were pelagic for a short period of time before becoming benthic in nature. Low numbers of P. hoyi in spring samples and high densities in summer samples were likely the result of reproduction and growth of greater numbers of young P. hoyi to a size where they became benthic and thus susceptible to the ponar grab sampler.

Low numbers of P. hoyi in autumn samples may have been the result of natural mortality, fish predation or intra-lake migrations. Based on an examination of fish larvae tows near the D. C. Cook Plant, Mozley (1974) found that P. hoyi occurred in the water column in late summer, but not in mid-summer, which could increase their susceptibility to fish predation. Examination of gut contents of yellow perch, smelt, trout-perch and spottail shiners indicated that P. hoyi were eaten during late summer months (Mozley 1975).

Analysis of size classes of P. hoyi indicated populations in the inner region were slightly advanced (larger size) compared with other regions (Fig.

5). Generally the intermediate region P. hoyi size-class distributions were more similar to those in the inner region than in the outer region. At 9 m, the inner region P. hoyi size classes in April were nearly devoid of gravid and spent females indicating near completion of reproduction and removal of spent individuals from the environment (i.e., females that have released their brood of young P. hoyi). Alley (1968) indicated that spent females died quickly. It is possible that dead, spent females decomposed quickly and were not available to the ponar since we rarely encountered decomposing P. hoyi at any stage of development. During April, slightly greater and much greater percentages of gravid and spent females were present in the intermediate and outer regions, respectively, when compared with the inner region. Although the dominant P. hoyi size class (3-5-mm individuals) was similar across regions at 9 m during July and October, the outer region P. hoyi population was comprised of a larger percentage of 3-mm individuals (7.5%) compared with the intermediate (1.8%) and inner (0%) regions.

P. hoyi size-class differences with respect to regions at 12 m were the same as that observed at 9 m during April. Although the intermediate and inner regions during July had similar size-class distributions of P. hoyi at 9 and 12 m, the size-class composition in the outer region was comprised primarily of 3-mm individuals (53%). Similar size-class distributions of P. hoyi were observed during October in all three regions where the 3-5-mm size class dominated (98-100%).

At 15 m, P. hoyi size-class distributions in April were similar to the previously noted trend at 9 and 12 m. There were no apparent differences in composition of P. hoyi size classes at 15 m during July and October. All regions during July and October were primarily inhabited by <3-mm and 3-5-mm

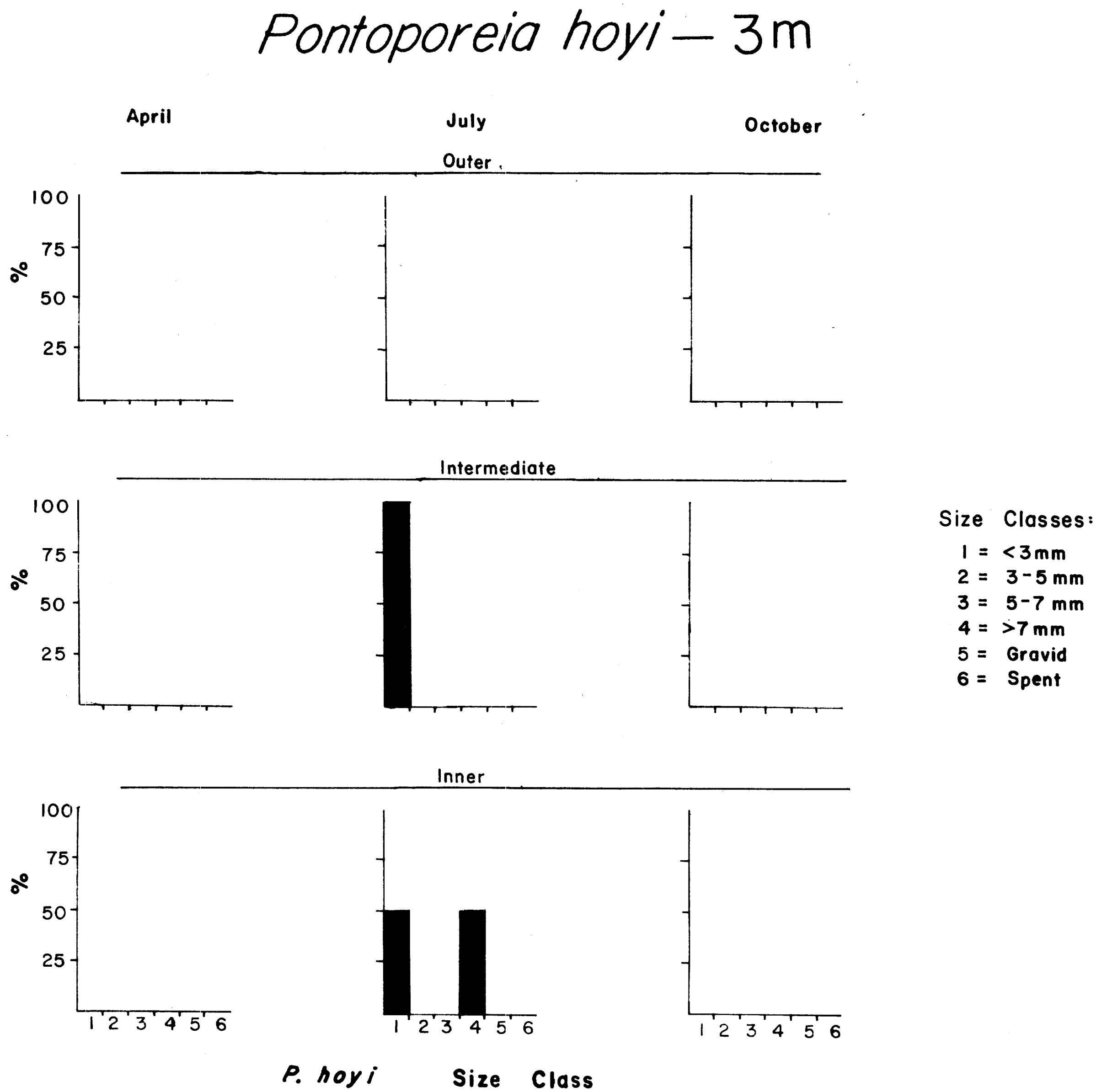
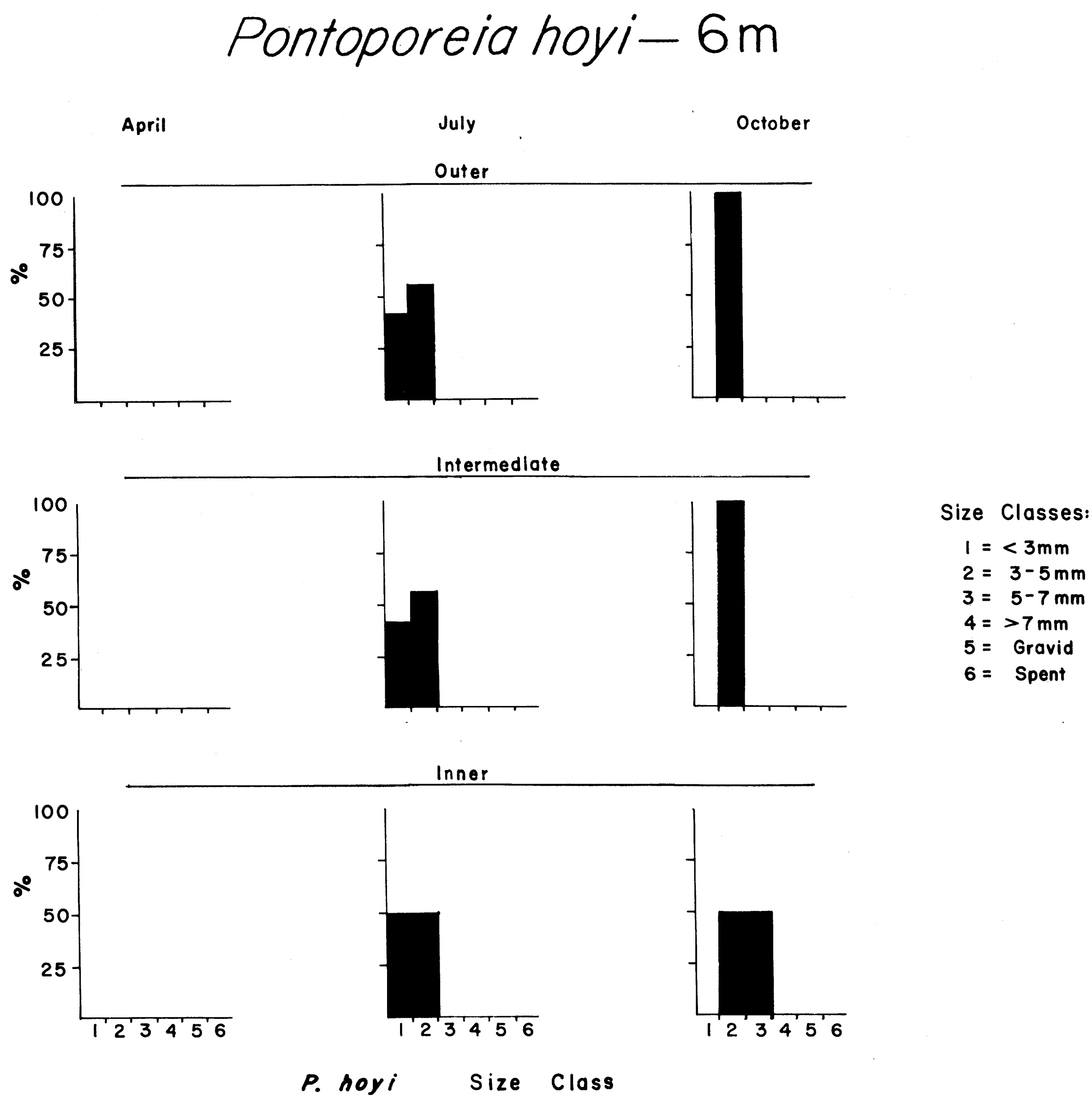


Fig. 5 . Percent distribution of P. hoyi size classes at 3-15 m among inner, intermediate and outer regions. Samples were collected during April, July and October 1978 from eastern Lake Michigan near the J. H. Campbell plant. * = <1%.



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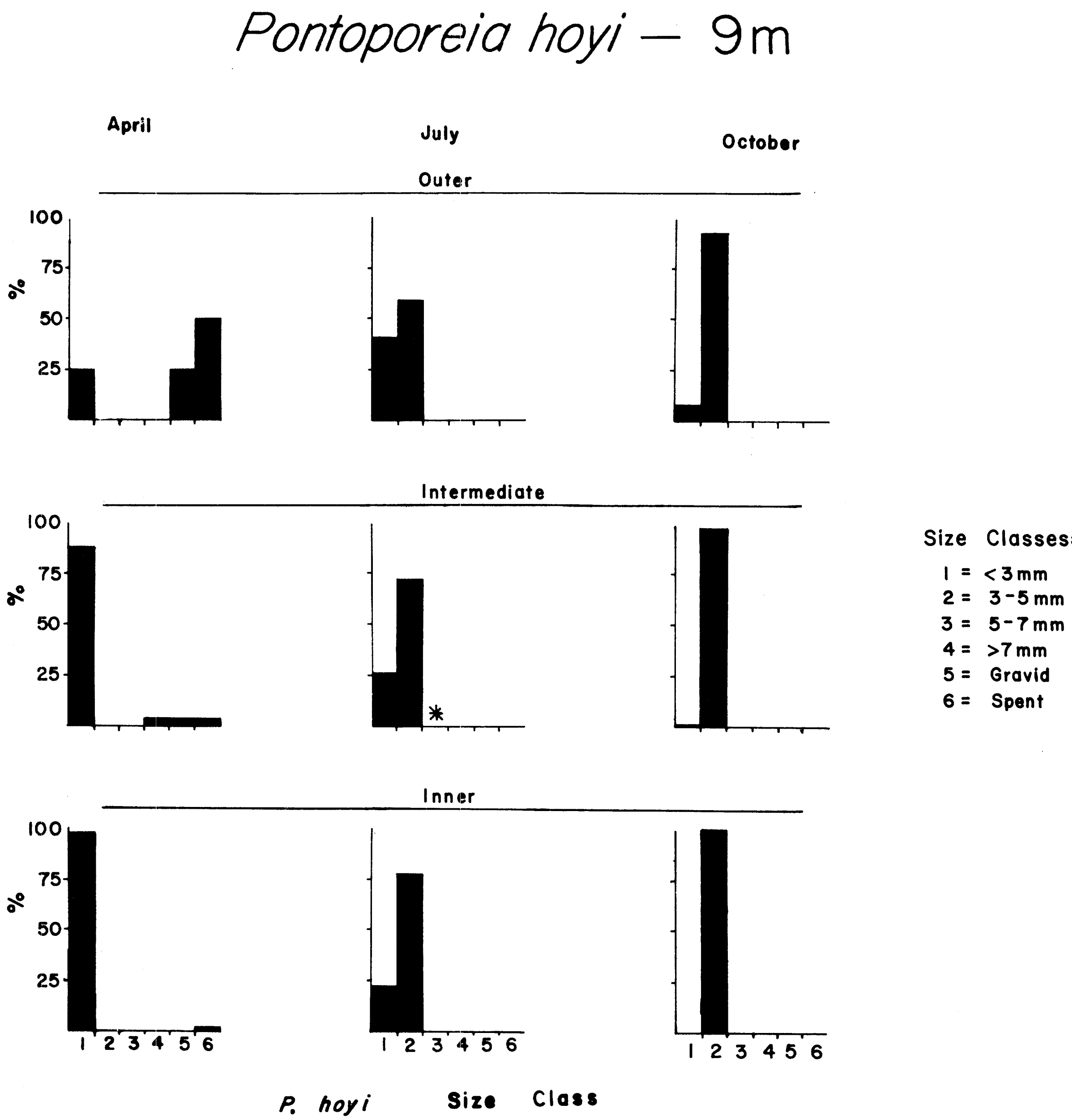

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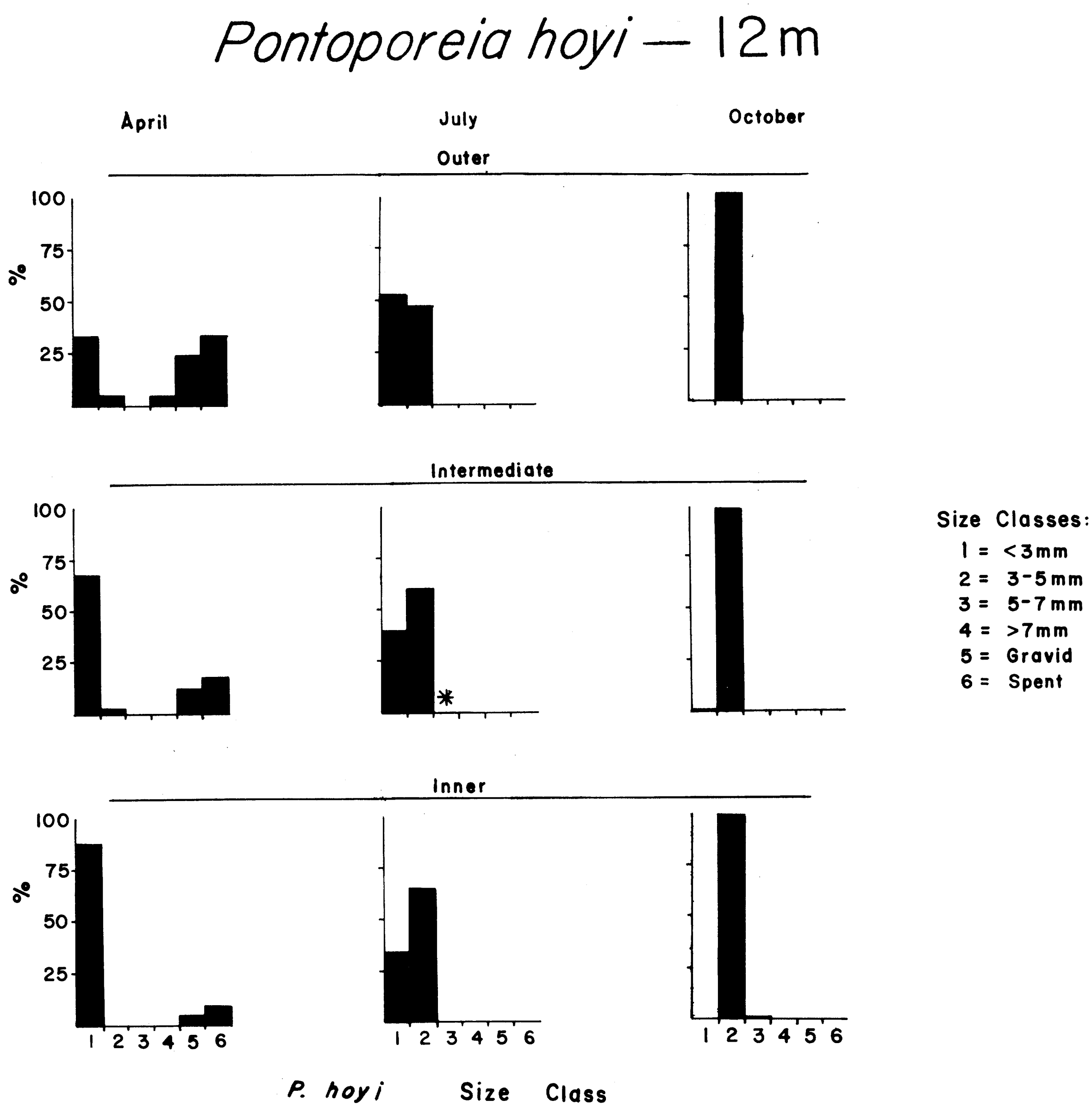

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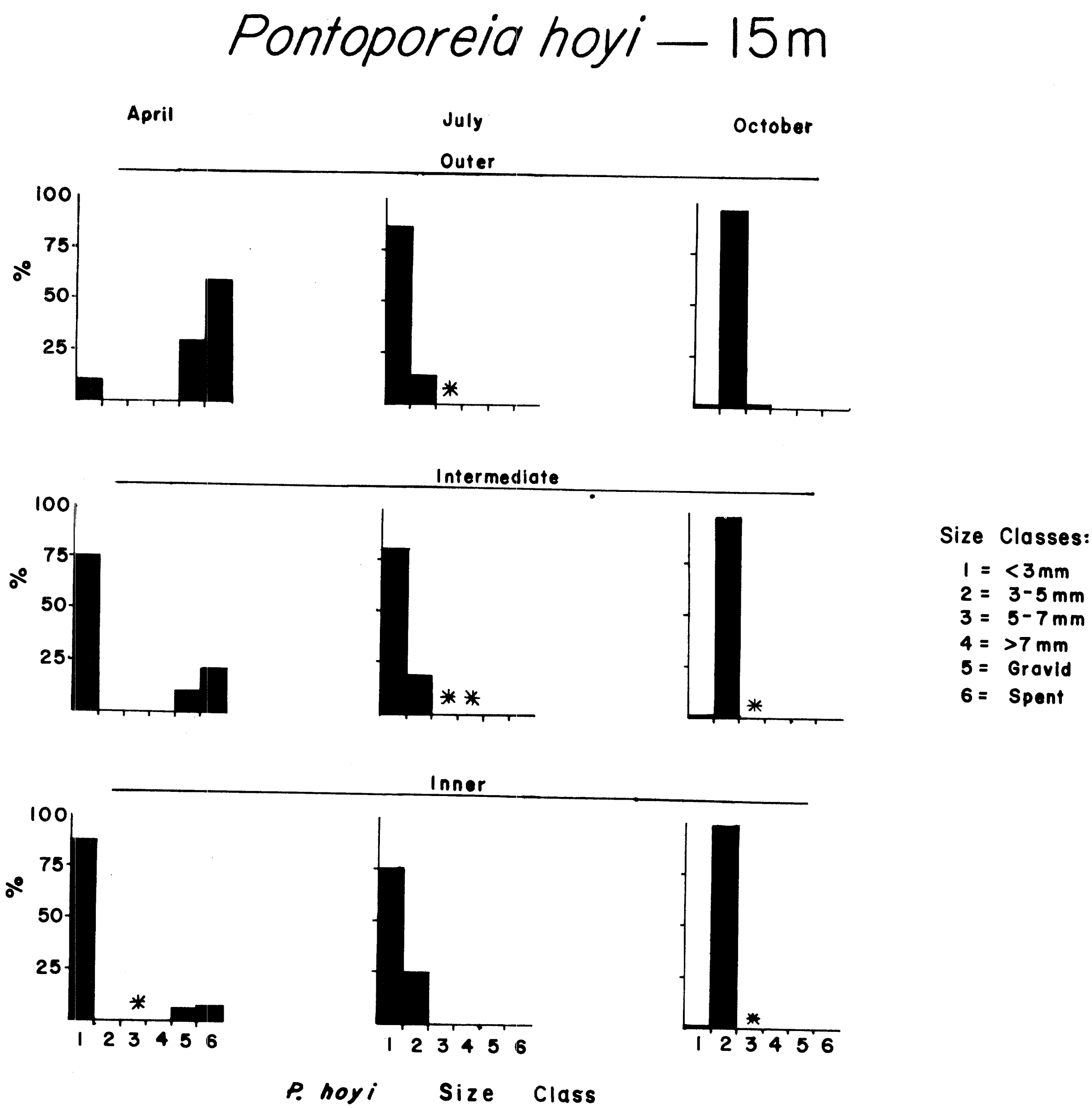

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individuals of *P. hoyi*, respectively.

Since the *P. hoyi* size-difference trend was most apparent in the inner region, a single factor or a complex set of factors may be functioning in the inner region to produce observed results. These factors include current shoreline thermal discharge, more favorable and/or stable food source in the inner region when compared to other regions or some other environmental condition(s). The effect warm water may have on release of young *P. hoyi* was noted by Mozley (1974). Studying *P. hoyi* populations near the D. C. Cook Nuclear Plant, Mozley (1974) noted that 1973 had a warmer winter and spring compared with 1970-1972 when similar temperature and *P. hoyi* data were collected. Increased water temperature during winter 1973 may have caused young *P. hoyi* to be released 1 to 2 mo earlier than the normally observed release month of April. Mozley's speculation on release was based on the relative absence of spent females and presence of <3-mm individuals in April 1973 at 8-16 m when compared with April 1972 for the same depth near the Cook Plant. A similar distribution pattern of decreased frequency of spent and gravid females and increased frequency of <3-mm individuals in the inner region at 9 and 12 m when compared with other regions near the Campbell Plant suggested that warm water discharged into the inner region may have accelerated release of young *P. hoyi*. Since *P. hoyi* size-class differences between the inner region and intermediate and outer regions at the Campbell Plant did not appear to be as divergent as that observed between April 1972 and April 1973 at the Cook Plant, release times of young *P. hoyi* in the survey area may have been less extreme than the 1- to 2-mo difference observed at the Cook Plant. It is hypothesized that young *P. hoyi* may have been released 1 to 3 wk earlier in the inner region when compared to other regions near the Campbell Plant.

The consequences of early release of *P. hoyi* are not known. However, Mozley (1974) found that the length (size class) attained in August 1973 by early released (i.e., possibly February or March 1973) *P. hoyi* was the same as that attained in August 1972 by *P. hoyi* released in April 1972. This comparison indicated no apparent growth differential between *P. hoyi* released early and the presumed general release period (April). A similar comparison from the Campbell survey area at 9 and 12 m supported the observation made at the Cook Plant. However, *P. hoyi* size-class differences observed in the inner region compared with other regions were not as extreme during July and October as they were during April at 9, 12 and 15 m. In particular, it was evident that by October at 9, 12 and 15 m the dominant *P. hoyi* size class observed (3-5 mm) was the same as that observed near the Cook Plant during October 1973 following the suspected early release of *P. hoyi* previously discussed. This observation suggests that although there appeared to have been an early release of *P. hoyi* in the Campbell inner region during April, the size-class difference between the inner region and remaining regions was maintained only slightly at 9 and 12 m during July. Since no *P. hoyi* size-class differences were evident among regions during October and although early release of *P. hoyi* had a short-term effect on growth of *P. hoyi*, there appeared to be no long-term effect due to early release of *P. hoyi*. Subsequent sampling over a number of years will document the permanency of the *P. hoyi* size-class distribution differences observed among regions in 1978.

The question of quantitative differences in mean densities of *P. hoyi* among regions will be dealt with in the statistical section. However, irrespective of quantitative differences in *P. hoyi* abundance in 1978 among regions, there was a qualitative difference as measured by *P. hoyi* size-class composition between the inner region and the intermediate and outer regions. Larger individuals were collected more consistently in the inner region when compared with remaining regions, particularly during April. Whether this observed *P. hoyi* size-class

distribution is permanent or an isolated occurrence limited to 1978 remains to be determined.

Chironomidae

Chironomids were represented by 30 taxa in the 1977 survey and 29 taxa in 1978. They were the most frequently encountered major taxon in the survey occurring in 95.2% of 270 samples collected in 1978 (Table 4). In 1978, four additional chironomid taxa not identified in 1977, brought the total to 34 for 1977 and 1978 (Table 2). Not found in 1978 but present in 1977 were *Polypedilum* cf. *halterale*, *Nanocladius* sp., *Paratendipes* sp., *Cladopelma* sp., *Heterotrissocladius* cf. *oliveri* and the undetermined orthoclads, sp. 2 and 3. Orthoclads sp. 2 and 3 may have been early instars of *Orthocladius* (*O.*) sp. 1, *Orthocladius* (*O.*) sp. 2, *Orthocladius* (*E.*) and/or *Parakiefferiella* sp. which were identified in later instars from 1978 samples. Early instar orthocladiini sp. 1 found in 1977 has been subsequently identified as *Hydrobaenus* sp. Present in 1978 but not found in 1977 were the chironomids *Chironomus halophilus*-gr. and *Potthastia* cf. *longimanus*. Absence of *H.* cf. *oliveri* from 1978 benthic samples was likely due to its preference for water deeper than the 3, 6, 9, 12 and 15 m depths sampled in 1978.

The number of chironomid taxa collected during 1978 was similar among inner (27), intermediate (24) and outer (26) regions. In addition, there was little difference in the number of chironomid taxa identified across regions, depths and months. The greatest number of chironomid taxa was present at 9, 12 and 15 m during April and July. The number of chironomid taxa collected was distributed evenly among depths sampled during October. While there were minimal differences with respect to regions at any particular depth and month, there tended to be more chironomid taxa in samples from deeper areas (9, 12 and

15 m) than from shallower areas (3 and 6 m).

Maximum density of chironomids was observed at 9 and 12 m in April and 6, 9 and 12 m in July and October (Fig. 6). This depth distribution pattern differed from that noted in June 1977 when abundance of chironomids was greatest at 3, 6 and 9 m and declined sharply at 12 m. Maximum mean density of chironomids was similar between the 2 yr (2500-5000 m^{-2}).

Only at 3 and 6 m were there large seasonal mean density fluctuations in chironomid populations (Fig. 6). Chironomid density was depressed in April at 3 and 6 m and in October at 3 m compared with remaining depths sampled during the respective months. Chironomids characteristic of the shallowest depths in June 1977 and July 1978 were *Robackia* cf. *demeijerei*, *Saetheria* cf. *tylus* and *Chironomus* sp. During April, *R*. cf. *demeijerei* attained maximum abundance at 3 and 6 m, but maximum densities of *S*. cf. *tylus* and *Chironomus* sp. were located deeper in the lake (9, 12 and 15 m) than expected (Appendixes 2 and 6). Maximum occurrence of *S*. cf. *tylus* and *Chironomus* sp. had shifted shoreward to shallower depths (3 and 6 m for *S*. cf. *tylus* and 3, 6, 9 and 12 m for *Chironomus* sp.) in July compared with April distributions.

While low densities of chironomids during April and October at 3 m may be the result of increased storm and wave activity, additional detrimental effects due to ice break-up in April may have further resulted in depopulating 3- and 6-m depths of the usual chironomid taxa inhabiting them. There appeared to be little storm or ice effects in April on benthos at 9 m.

Visual observation of ice ridges frozen into sediments has been reported by O'Hara and Ayers (1972). Seibel (1972) indicated that subsequent spring break-up of ice ridges has a definite effect on bottom topography. Seibel et al. (1975), working near the D. C. Cook Plant, recorded three ice ridges

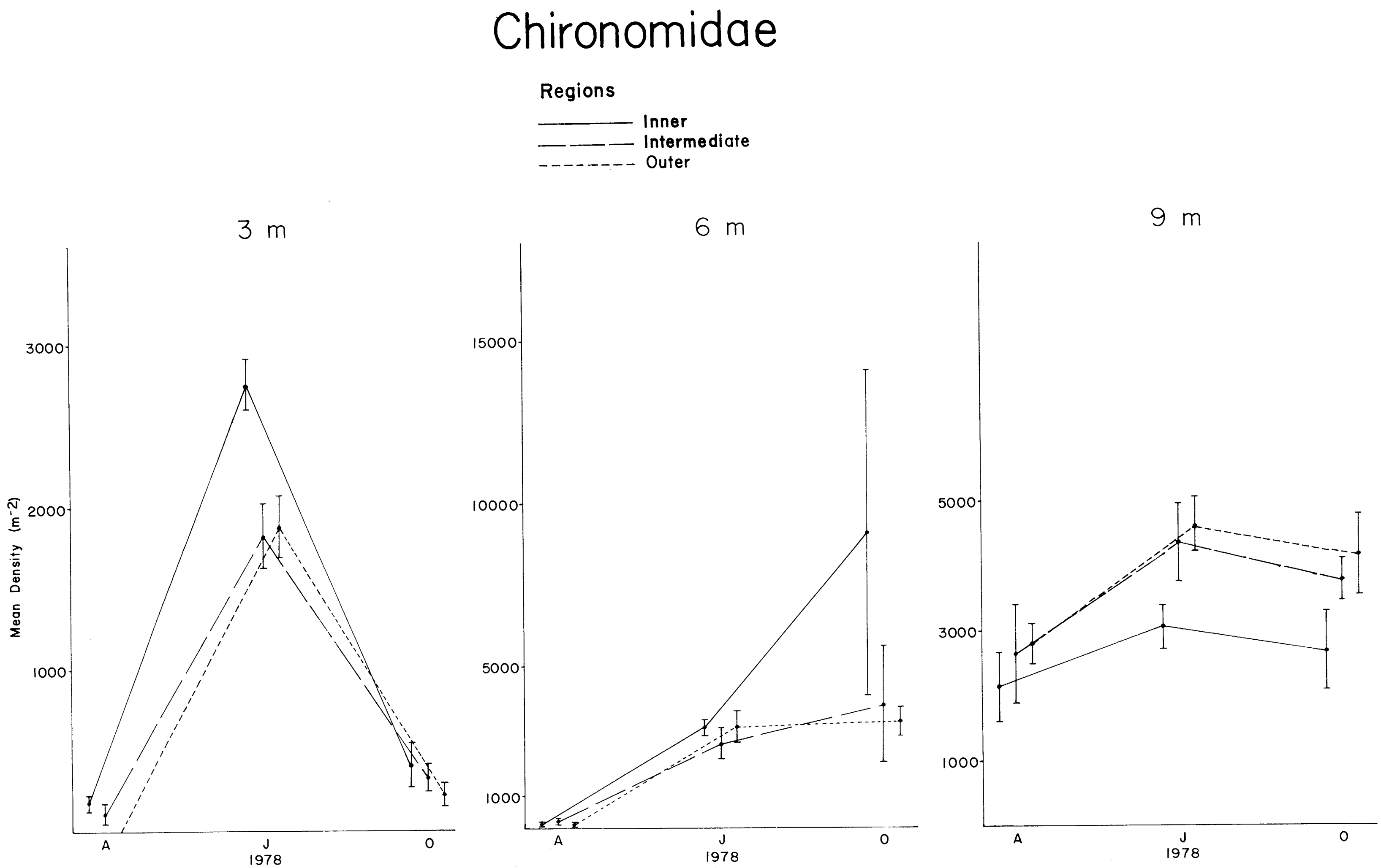
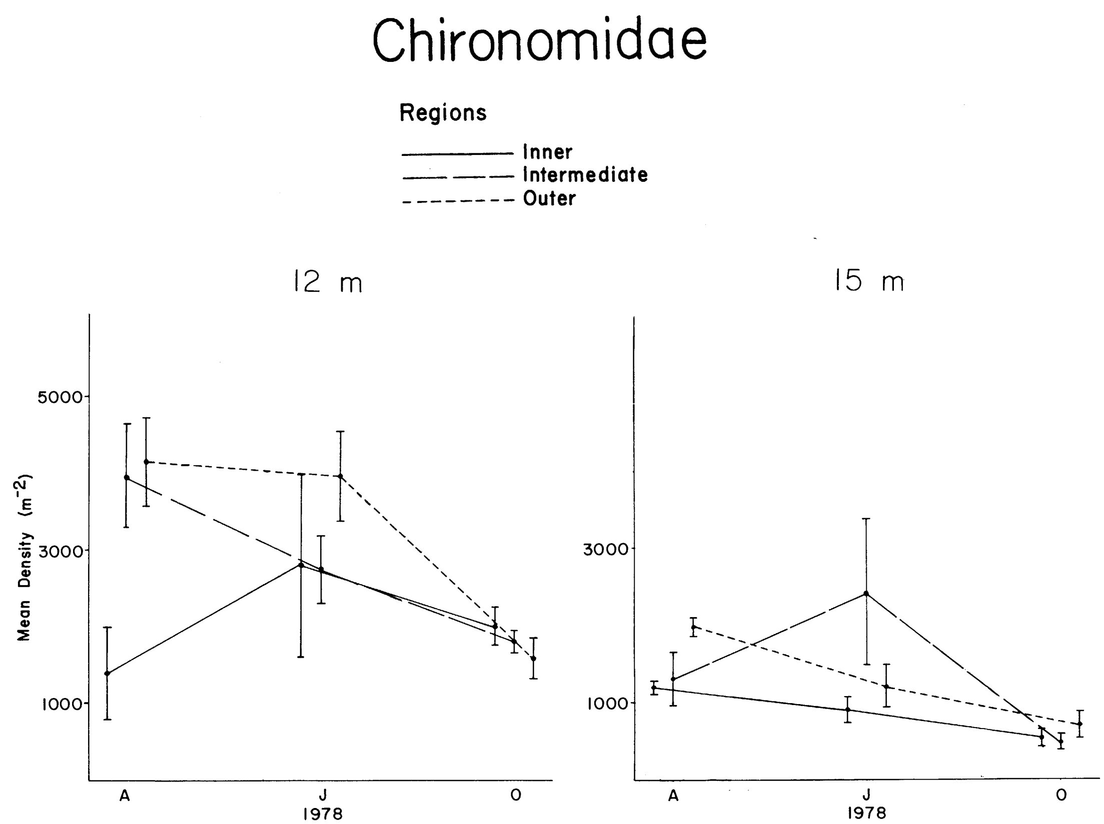


Fig. 6 . Regional mean densities (number m^{-2}) of chironomids collected in April, July and October 1978 from eastern Lake Michigan at 3-15 m near the J. H. Campbell Plant. Standard error denoted by vertical bar (n = 6). Inner region = treatment area near present thermal discharge, intermediate and outer regions = reference areas.



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located at <1 m, 2-3 m and 4-6 m. Spring ice break-up caused nearshore, offshore and/or alongshore deposition of ice-locked sediments and scour due to wave action on ridges that had broken loose from the bottom. There is no clear evidence that these factors caused the chironomid density differences observed in April and October at 3 and 6 m; however, it is most certain that chironomids at the shallowest depths were affected by wave and ice interaction with nearshore sediments. The potential significance of these factors needs to be considered since unusually low density or low number of taxa in April or October at 3 and 6 m may be the result of naturally occurring physical processes and not necessarily plant-related effects.

On a yearly averaged basis, R. cf. demeijerei, S. cf. tylus, Paracladopelma camptolabis-gr. and Chironomus sp. (mostly fluviatilis-gr.) were the dominant chironomid taxa at 3, 6 and 9 m (Appendixes 2 and 6). At 9, 12 and 15 m, Polypedilum cf. scalaenum, Cladotanytarsus sp. and P. camptolabis-gr. were usually dominant. However, in April and July, Micropsectra sp., Hydrobaenus sp., Orthocladius (O.) sp. 1 and Heterotrissocladius cf. changi were important chironomid taxa found primarily at 12 and 15 m.

Although dominance of the three to five most numerous chironomid taxa fluctuated when comparing regions at each depth and month, no consistent trends were apparent. Exceptions occurred at 6 m in April and October. In the inner region at 6 m in April, chironomid dominance was evenly distributed among five taxa as compared to one or two taxa dominating intermediate and outer regions. Due to low numbers encountered and patchy distributions in April, possibly caused by wave and ice activity, observed differences were likely temporary.

Chironomid regional mean densities were similar for any particular depth and month in all cases except at 3 m in July and 6 m in October. At 3 m in

July, *Chironomus fluviatilis*-gr. was approximately 3 to 4 times more numerous in the inner region than in the intermediate and outer regions. Each region was dominated by the same instar (fourth) indicating no life cycle advancement. All other prevalent chironomid taxa occurring at 3 m in July had similar densities among regions. At present, no significance can be ascribed to this observed difference.

At 6 m along transect south 1 in October, replicates B and C contained very high densities of early instar *S.* cf. *tylus*, 16,786 m^{-2} and 28,906 m^{-2}, respectively. Compared to the other four grabs in the inner region at 6 m, the high density of *S.* cf. *tylus* appeared to be an isolated patch. The patch appeared to be small enough such that the first replicate at this station did not sample it at all. This exception to the observed trend of chironomid regional mean densities being similar for any particular depth and month appeared to be a temporary, isolated occurrence.

At 6 m in the inner and intermediate regions during October, early instars of *S.* cf. *tylus* occurred in the greatest observed density of any chironomid collected during the 1978 survey. Contrary to the dominance of *S.* cf. *tylus* in the inner and intermediate regions, the outer region was dominated by *P. camptolabis*-gr. Both taxa occurred in low densities at 6 m in October in regions where the other respective taxon was dominant. Since both taxa occurred together in similar densities at a number of other region and depth locations, it appeared to be an isolated difference.

Analysis of larval instars of the most numerous chironomid taxa found near the Campbell Plant may serve as a valuable tool to evaluate the effect of heated discharge water on the life cycle of chironomids. The life cycle of the chironomid is holometabolous having the following stages: egg, larva, pupa and

adult (Oliver 1971). Since the ponar is designed to sample only the larger aquatic stages of the life cycle, it does not permit an evaluation of egg masses, or the terrestrial adult stage, and confines analysis to the larvae and pupae. Once hatched from the egg, chironomid larvae go through four larval instars before becoming pupae and eventually adults. However, also excluded from the analysis due to the mesh size of concentrating nets (350 microns) is the first instar of most chironomid taxa and second instar of some other taxa. In most cases second through fourth (last) instar larvae are retained in sufficient numbers for comparison among regions at a given depth and month.

Comparisons among regions at a particular depth and month were made for instars of the most numerous chironomids near the Campbell Plant. In all cases the same instar was predominant across all regions indicating similar conditions existed among regions with respect to depth and month for observed chironomid taxa. Similar comparisons will be made in future surveys.

Maximum density of chironomids in 1978 was dependent upon depth, month, life cycle considerations of the animals and physical processes in the lake. There were no apparent regional factors causing chironomids to be consistently more numerous in any of the three defined regions. Where regional differences existed, they tended to be temporary and isolated. Generally, depth-related community composition was similar to that observed in the June 1977 pilot survey with specific variations most prevalent in April. Overall, chironomid distribution, composition and life stages were similar throughout the survey with respect to depth and month of comparison. Statistical analysis in the following section will serve to define density similarities among regions at each depth.

Naididae

Of the 15 naidid species identified from samples collected during the 1978 survey, three species, *Chaetogaster diastrophus*, *Chaetogaster setosus* and *Pristina osborni*, were new to the Campbell survey area when compared with 1977 results (Jude et al. 1978). This brings the naidid species total to 19 for 1977 and 1978 (Table 2). Three species, *Nais elinguis*, *Nais bretscheri* and *Arcteonais lomondi*, from the 1977 survey (Jude et al. 1978) were not found in 1978. Most notable was the absence of *N. elinguis* which was the most abundant naidid at 3 m in June 1977. Possibly, individuals of *N. elinguis* were too small to be retained by 350-micron mesh nets used during the months sampled; however, very small individuals, e.g. *Amphichaeta leydigii*, were retained. No immediate explanation can be offered.

In 1978 naidids were the second-most frequently collected group as measured by percentage of samples having one or more individuals present (74%) (Table 4). The most numerous naidid species collected were *Piquetiella michiganensis*, *Chaetogaster diaphanus*, *Stylaria lacustris* and *Uncinais uncinata* (Appendixes 3 and 7). Samples taken during April and October were comprised of few naidids other than *P. michiganensis*. Only during July did other naidid species attain any significant proportion of the naidid population. *U. uncinata* dominated the 3-m depth in July and along with *C. diaphanus* was the most commonly collected naidid at 6 m. All four of the most abundant naidid species above were equally numerous at 9 m. At 12 m, *U. uncinata* decreased in density and the remaining three naidid species, *P. michiganensis*, *C. diaphanus* and *S. lacustris*, had similar abundances (Appendix 3). *S. lacustris* and *P. michiganensis* were the two most numerous naidid species at 15 m during July.

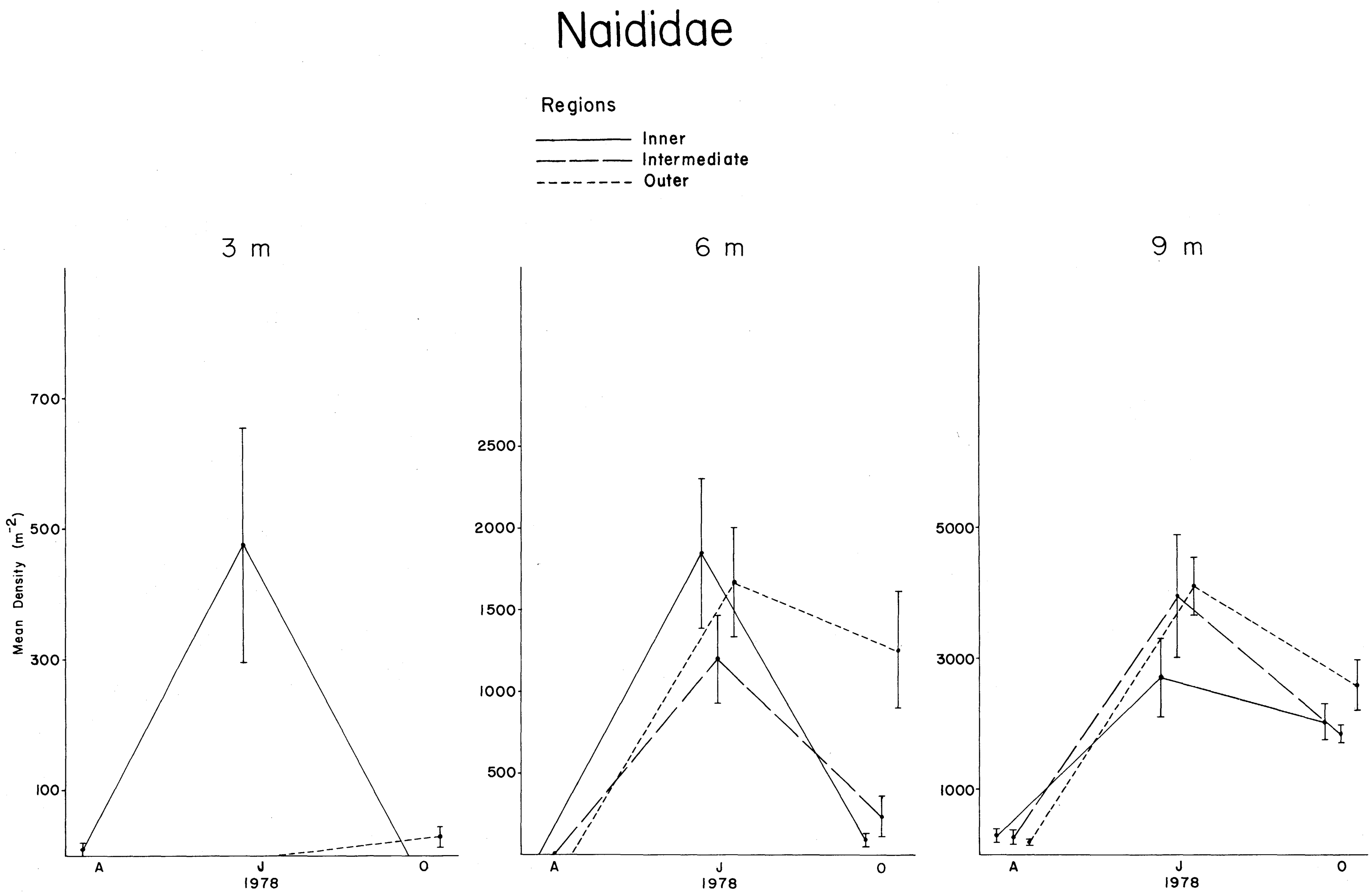


Fig. 7. Regional mean densities (number m^{-2}) of naidids collected in April, July and October 1978 from eastern Lake Michigan at 3-15 m near the J. H. Campbell Plant. Standard error denoted by vertical bar (n = 6). Inner region = treatment area near present thermal discharge, intermediate and outer regions = reference areas.

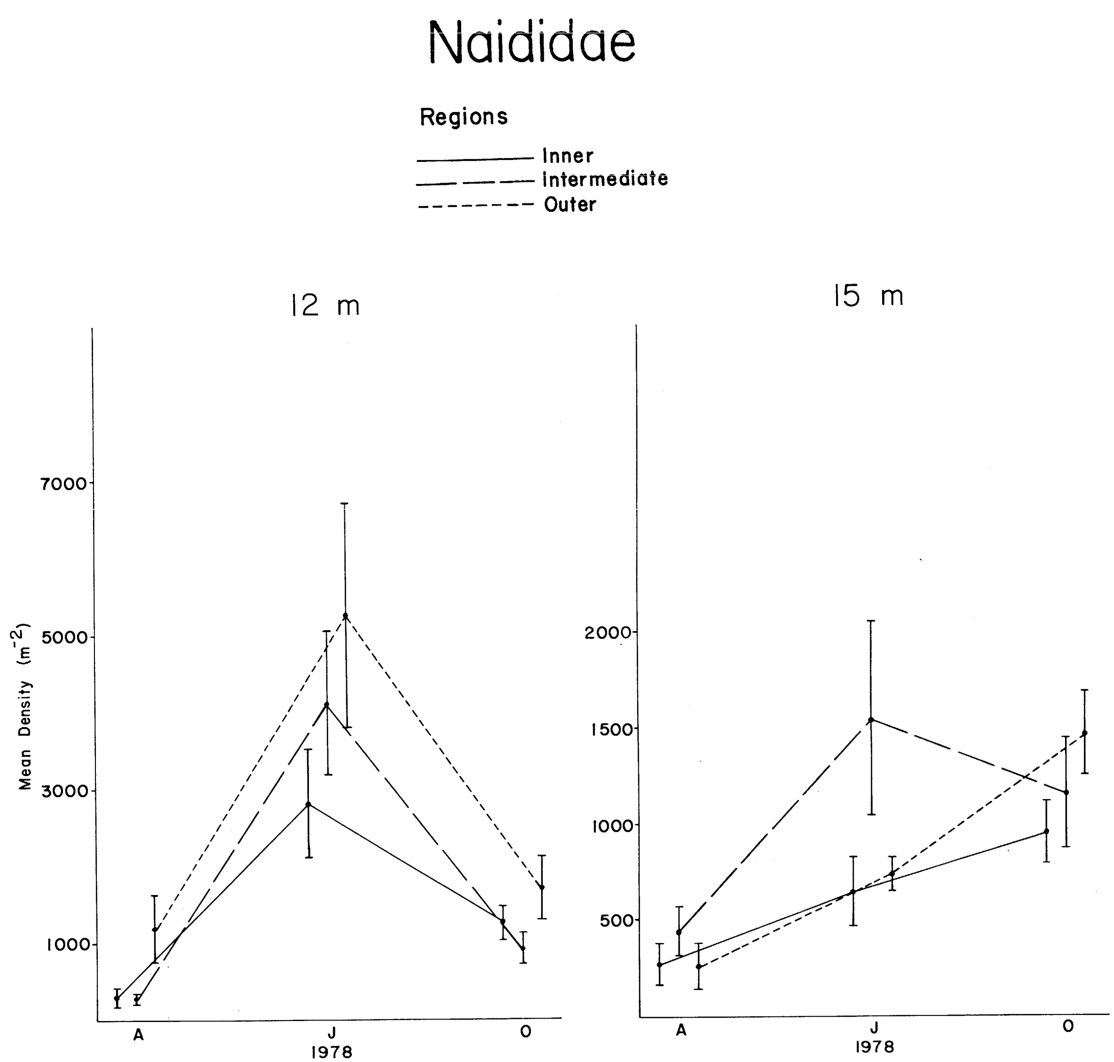


Fig. 7. Continued.

Naidid mean densities were comparable across regions at any particular depth and month except in the inner region at 3 m in July (Fig. 7). Although naidids were present at 3 m only in the inner region when compared with remaining regions in July, comparison of 3-m naidid mean densities with other depths sampled in July indicated the inner region mean density at 3 m in July was low. Therefore, while naidids were not observed in the intermediate and outer regions at 3 m, mean density of naidids in the inner region was low by comparison to other depths and seemed like a short-term, random difference. In addition, naidid mean densities at remaining depths among regions in July were similar.

In most instances, naidid mean densities were low in April, attained a peak in July, and decreased in October to densities near April levels. Maximum density of naidids was observed at 9 and 12 m in July. The depth distribution pattern of naidids in 1978 was similar to that documented in June 1977 when naidids were similarly abundant at 6, 9 and 12 m (Jude et al. 1978).

Based on observed mean densities, there appeared to be no differences among regions at any depth and month for naidids in 1978 near the Campbell Plant. Differences among regions at any particular depth for time-pooled data will be described in the statistical section to follow.

Tubificidae

Of nine identified tubificid species collected in 1978 near the Campbell Plant, only *Limnodrilus hoffmeisteri*, *Limnodrilus angustipenis* and *Potamothrix moldaviensis* were numerous and occurred frequently in samples containing mature tubificids. *P. moldaviensis* was the most abundant identified tubificid species in 1978. However, the most numerous category of tubificids collected was immature tubificids without hair chaetae. Overall, tubificids were the third

most frequently encountered major taxonomic group, occurring in 64% of the samples taken in 1978 near the Campbell Plant (Table 4).

Present in 1977, but not in 1978, were Peloscolex superiorensis, L. claparedeianus and Rhyacodrilus coccineus. While the first two species occurred primarily at depths greater than 15 m, all were rare in 1977. Additional tubificid species occurring in 1978 samples, but not 1977 (Jude et al. 1978), were Limnodrilus udekemianus and Aulodrilus limnobius. Tubificid species identified during 1977 and 1978 from the Campbell plant area stand at 12 with the completion of the 1978 survey (Table 2).

Tubificids occurred in low densities at depths less than 9 m (Appendixes 3 and 7). At 9, 12 and 15 m mean densities of tubificids were similar across depths, regions and months in most instances (Fig. 8). Only the inner region at 12 m in April and July had low densities compared to other regions. This pattern did not persist throughout the year since inner region tubificid density was similar to other regions at 12 m in October.

Considering the 9-, 12- and 15-m depths where the main portion of the tubificid population occurred in 1978, percent mature tubificids without hair chaetae (percentage expressed as percentage of total tubificids without hair chaetae) increased from 4 to 10% among regions in April to maximum values of 13 to 48% among regions in July (Table 5). Percentage of mature tubificids in October was the lowest observed (0 to 3%). The data suggest maturation was occurring from April through July. This same pattern has been observed by Mozley (1975) at the Cook Plant, southeastern Lake Michigan . Additionally in October there was an influx of large numbers of small immature tubificids in all regions near the Campbell Plant (Fig. 9). Hiltunen (1967), working in the southern end of Lake Michigan, has also shown a decrease in mature tubificids

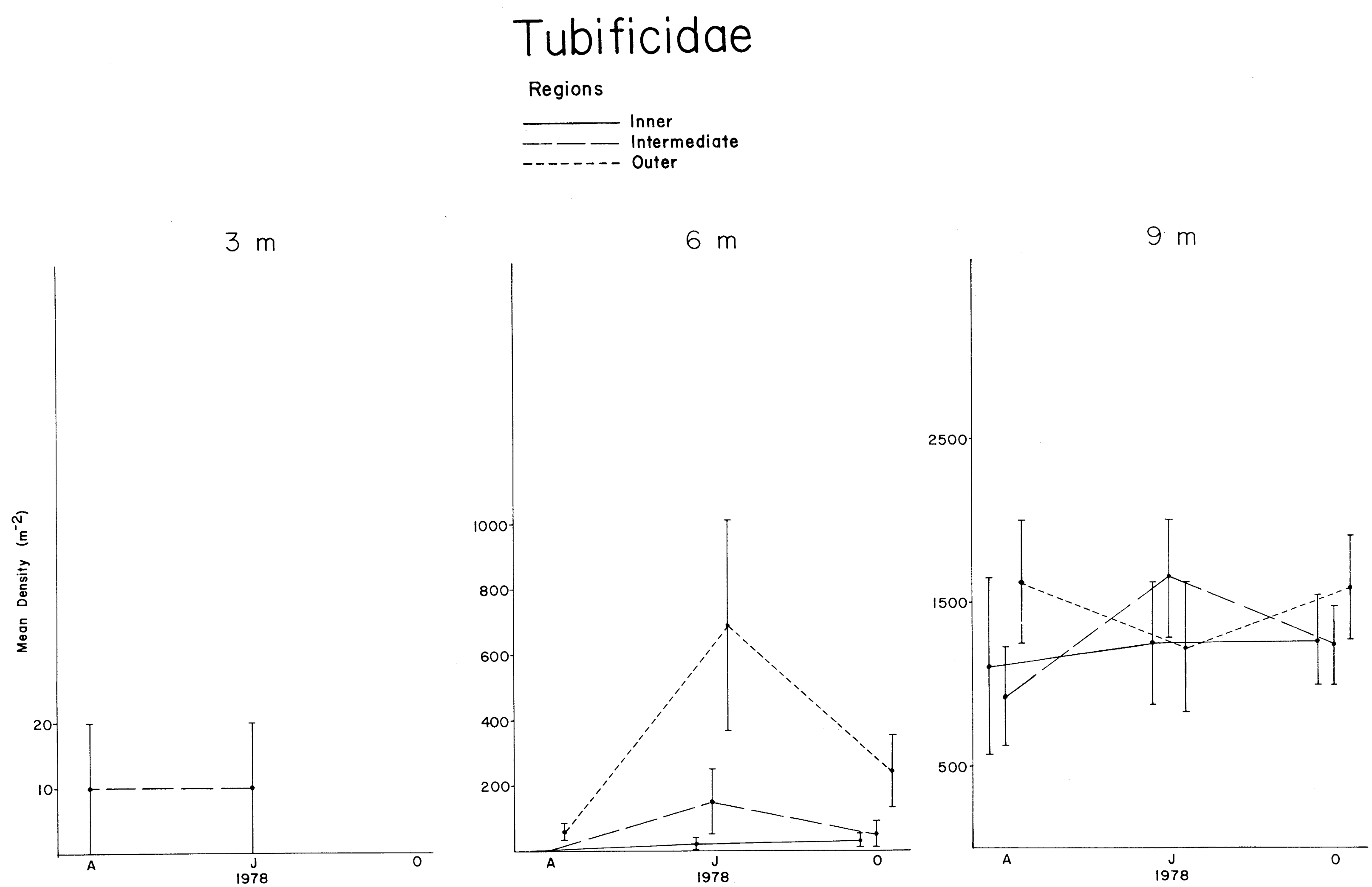
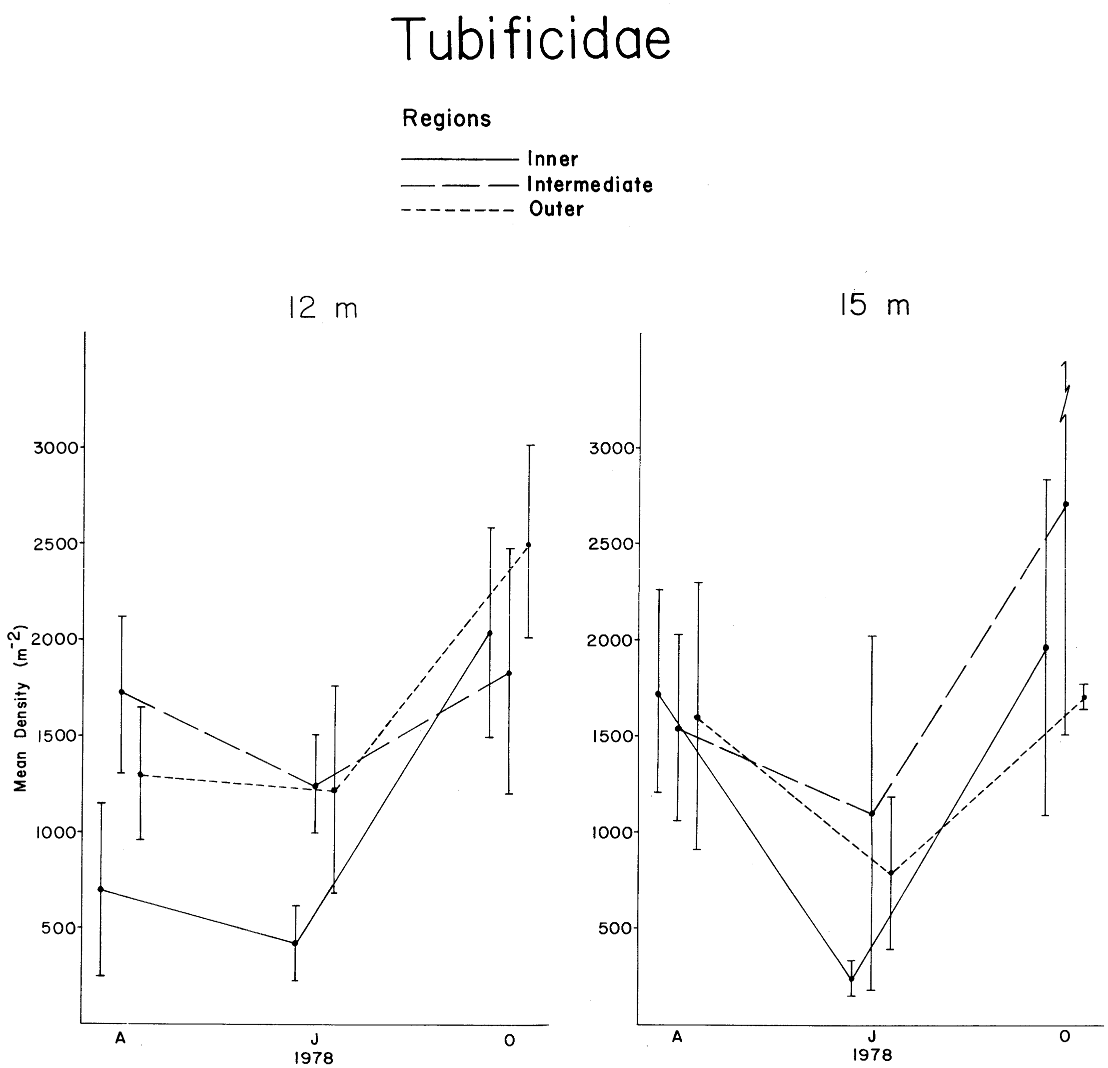


Fig. 8 . Regional mean densities (number m^{-2}) of tubificids collected in April, July and October 1978 from eastern Lake Michigan at 3-15 m near the J. H. Campbell Plant. Standard error denoted by vertical bar (n = 6). Inner region = treatment area near present thermal discharge, intermediate and outer regions = reference areas.



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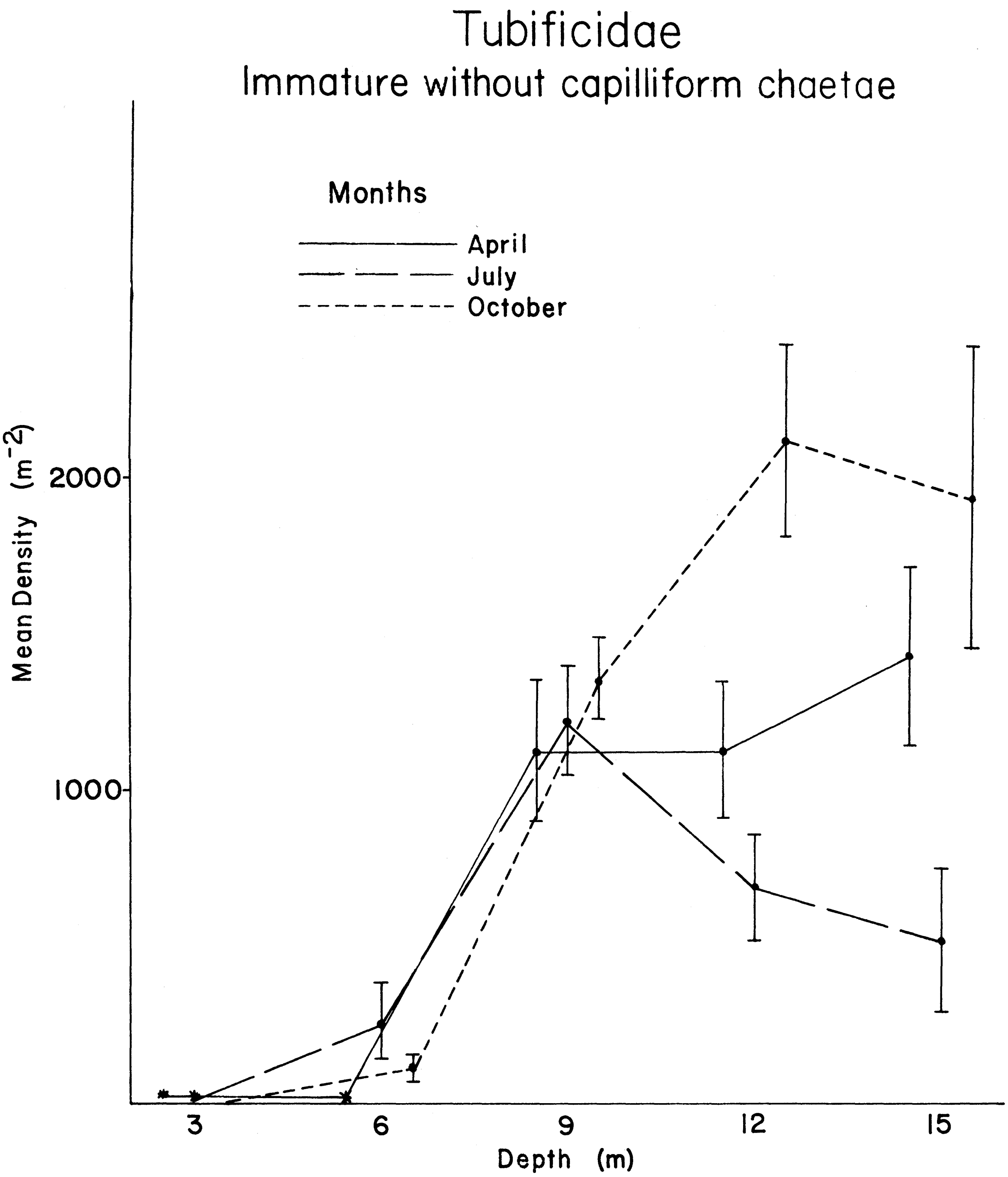

Fig. 9 . Mean density (number m^{-2}) of immature tubificids without capilliform chaetae in April, July and October 1978 at 3-15 m in eastern Lake Michigan near the J. H. Campbell Plant. Standard error denoted by vertical bar (n = 18). * = < 20 m^{-2}.

from July to October, while increased numbers of immatures without hair chaetae were observed over the same period.

TABLE 5 . Percent mature tubificids without hair chaetae collected during April, July and October 1978 in the inner, intermediate (inter) and outer regions at 9-15 m near the J. H. Campbell Plant, eastern Lake Michigan. Percentages derived from numbers of mature tubificids without hair chaetae divided by summed numbers of mature and immature tubificids without hair chaetae.

		Depth		
Month	Region	9 m	12 m	15 m
April	Inner	7	4	10
April	Inter	5	10	7
April	Outer	9	10	8
July	Inner	16	48	13
July	Inter	24	23	19
July	Outer	21	28	19
October	Inner	0	0	3
October	Inter	0	0	2
October	Outer	2	0	1

Consistent disparities in the percentage of mature tubificids found among regions at any particular depth and month over years may lead to speculation concerning effects causing increased or decreased numbers of mature tubificids. In 1978, percent composition of mature tubificids was similar in April and October across regions at 9, 12 and 15 m. In July a similar percentage of matures was observed at 9 and 15 m among regions, but the inner

region at 12 m was composed of 48% matures compared with 23-28% matures in remaining regions. However, it should be noted that, as mentioned before, tubificid density was considerably lower in the inner region at 12 m during July when compared with other regions, and consequently a few matures in the inner region made a large difference in the percentage matures reported. Due to density differences little significance will be attributed to this result at 12 m during July at present.

Disparities among percent matures found over depth, region or months are not necessarily related to thermal discharge effects since food availability, ambient temperature fluctuations due to seiching or cold springtime temperatures and sediment characteristics may be factors altering reproductive activities among tubificids. There appeared to be no definable cause for the observed difference in the percentage of mature tubificids found among regions at 12 m in July aside from density differences among regions. Continued comparison will provide useful information regarding any consistent, long-term trends.

Stylodrilus heringianus

Although occurrence of *S. heringianus* was limited to depths greater than 6 m, only minimal densities were observed at 9 and 12 m (Appendixes 3 and 7). Frequency of occurrence of *S. heringianus* in 1978 samples was limited to 13% (Table 4). Maximum abundance in the survey area during 1978 was located at 15 m during July and October (Fig. 10). No *S. heringianus* were collected at any depths sampled during April.

Regional mean-density differences were present at 15 m in both July and October. In July at 15 m the inner region *S. heringianus* population was considerably less numerous when compared with those in other regions. In

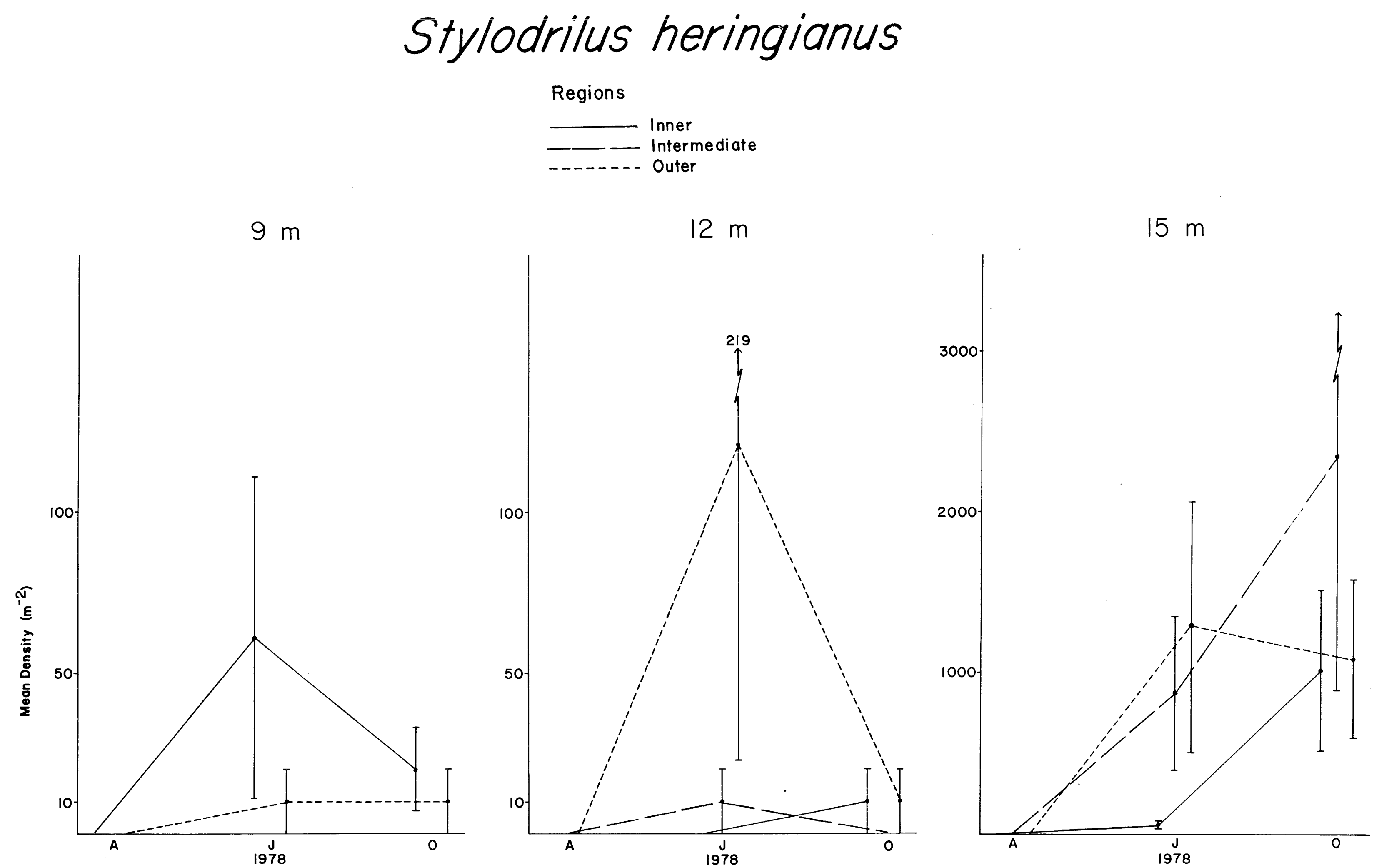

Fig. 10. Regional mean densities (number m^{-2}) of S. heringianus collected in April, July and October 1978 from eastern Lake Michigan at 3-15 m near the J. H. Campbell Plant. Standard error denoted by vertical bar (n = 6). Inner region = treatment area near present thermal discharge, intermediate and outer regions = reference areas.

October at 15 m the number of *S. heringianus* in the intermediate region was about twice that of the inner and outer regions. No interpretation of the observed distribution pattern can be rendered at present. Statistical analysis of time-pooled data will be employed in the following section to determine if regional differences were present at any particular depth.

The general depth distribution pattern of *S. heringianus* followed the same pattern observed in 1977 (Jude et al. 1978). Data from June 1977 near the Campbell Plant indicated that *S. heringianus* attained maximum nearshore density at 15 m and was still increasing in density at 25 m (maximum depth sampled in 1977). Average abundance of *S. heringianus* in the June 1977 survey area was 933 m^{-2} which was similar to that observed in July 1978.

Pisidium

Twelve species of *Pisidium* were identified from samples examined during the 1978 survey. All species collected in 1978 were present in samples taken in 1977 (Jude et al. 1978) with the exception of *P. supinum*. Due to taxonomic advances (to be published shortly - see METHODS) distinctions between *P. henslowanum* and *P. supinum* were not made in 1977. Not identified from 1978 samples but present in 1977 were *P. ferrugineum*, *P. subtruncatum*, *P. milium* and *P. idahoense*. The former two species occurred most frequently at depths of 15 m or greater. The latter two species were rare in 1977. In all, 16 species of *Pisidium* were identified from the Campbell area during 1977 and 1978 (Table 2).

In 1978 *Pisidium* occurred in 54% of the samples taken near the Campbell Plant (Table 4). Low *Pisidium* densities (<60 m^{-2}) were observed at depths less than 9 m. Regional mean densities ranged from 100 to 200 m^{-2} at 9 m, 200 to 400 m^{-2} at 12 m and 500 to 1500 m^{-2} at 15 m (Appendixes 4 and 8). The 1978

depth distribution of _Pisidium_ was very similar to that observed in June 1977 (Jude et al. 1978).

There was little temporal or regional difference among mean densities of _Pisidium_ at any particular depth (Fig. 11). Only at 15 m in July was there any notable regional mean-density difference. Inner region mean density was approximately one-third of the corresponding densities in intermediate and outer regions. _Pisidium_ species composition was very similar among regions indicating ambient conditions favored similar species composition in the inner region compared to other regions.

Sphaerium

Sphaerium was represented by the same species identified in 1977 from the Campbell Plant area; _S. striatinum_, _S. transversum_ and _S. nitidum_, in order of decreasing abundance (Table 2). Low density of _S. nitidum_ observed in the 1978 survey was likely related to its preference for cooler, deeper water (Henson and Herrington 1965). In June 1977, _S. nitidum_ occurred only at depths greater than 15 m.

In 1978, _S. transversum_ and _S. striatinum_ were most numerous at 9-, 12- and 15-m depths but were most abundant at 15 and 20 m in 1977. Maximum density of _S. transversum_ was observed in the intermediate region at 9 m during October 1978 when three individuals were found (Appendixes 4 and 8). _S. striatinum_ was the most numerous sphaeriid collected near the Campbell Plant. However, regional mean density of _S. striatinum_ did not exceed 40 m^{-2}. Occurrence of _S. striatinum_ was not limited to any region or month. Most frequent and numerous occurrences of _S. striatinum_ were observed at 15 m.

Sphaerium was infrequently encountered in samples collected during 1978 (6% of 270 samples - Table 4). Because of low frequency and low densities

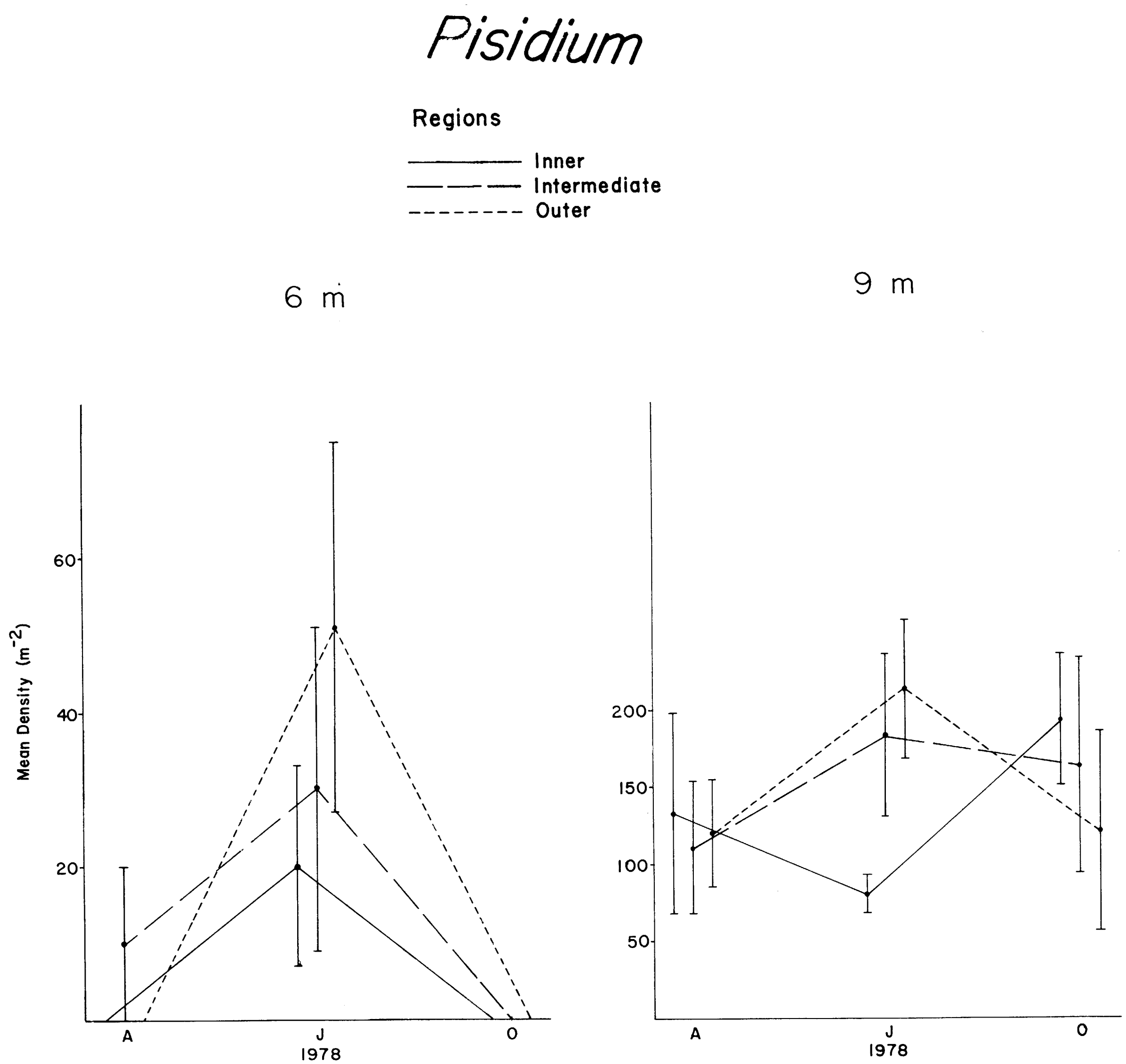

Fig. 11. Regional mean densities (number m^{-2}) of <u>Pisidium</u> collected in April, July and October 1978 from eastern Lake Michigan at 3-15 m near the J. H. Campbell Plant. Standard error denoted by vertical bar (n = 6). Inner region = treatment area near present thermal discharge, intermediate and outer regions = reference areas.

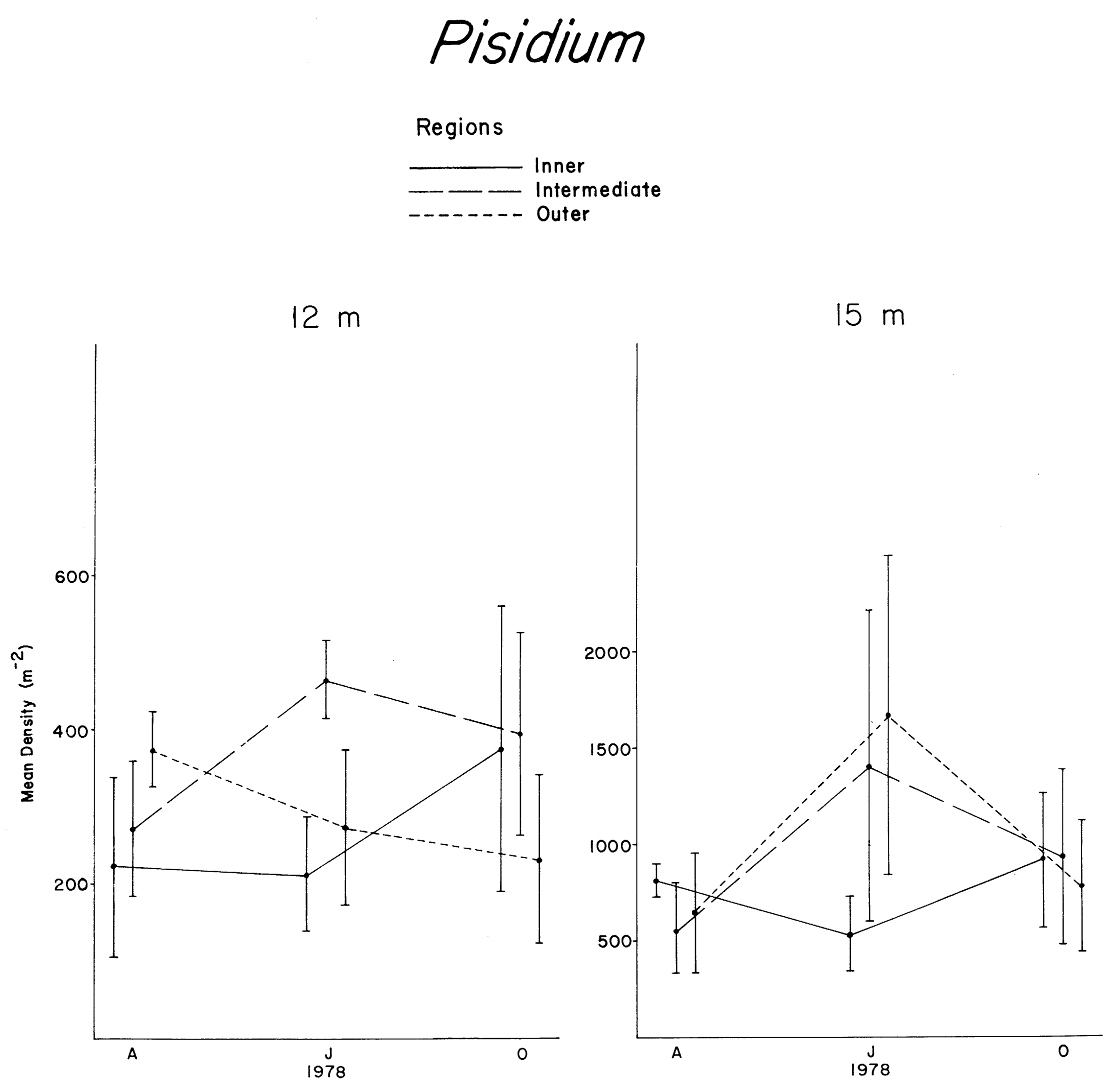

Fig. 11. Continued.

little can be stated regarding regional distribution. Mozley (1974) also encountered this problem at the Cook Plant, southeastern Lake Michigan. However, general depth distribution and regional occurrence will continue to be monitored. Changes in S. transversum density and location may be of interest since they have been used as an indicator of eutrophic conditions in other studies (Henson and Herrington 1965).

Gastropoda

Gastropods were represented by four taxa in the 1978 survey (Table 2). Total number of gastropod taxa identified from the Campbell area during 1977 and 1978 increased to four with the addition of Bythinia tentaculata in 1978. Most unidentified Valvata sp. in 1978 were probably V. sincera, which was the most numerous snail near the Campbell Plant in 1978. V. sincera was the most abundant snail in the 1977 survey and has been consistently shown to be the most numerous snail in this area of Lake Michigan (Mozley 1973, 1974, 1975). Overall, gastropods were represented in 32% of the samples collected in the 1978 Campbell survey area (Table 4).

At depths less than 9 m, the only gastropods present in samples were V. sincera and Amnicola sp. which occurred in low densities during July at 6 m (Appendixes 4 and 8). Gastropods began to be prevalent at 9 m, but not until 12 m did mean densities exceed 100 m^{-2} (Fig. 12). Maximum abundance of gastropods occurred in July at 15 m (300 m^{-2}).

There were only minimal regional differences observed in the mean density of gastropods when compared at any particular depth and month in 1978. Further analysis of data regarding this observation will be performed in the statistical analysis section.

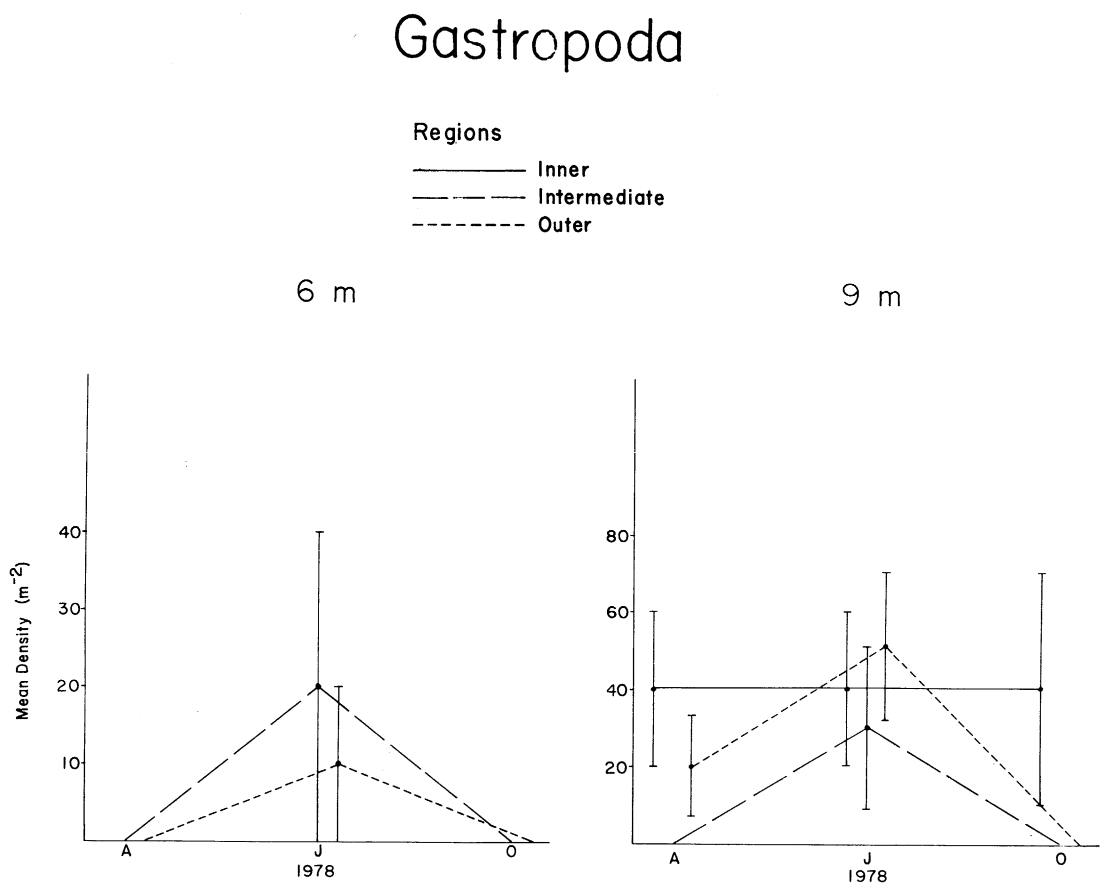

Fig. 12. Regional mean densities (number m^{-2}) of gastropods collected in April, July and October 1978 from eastern Lake Michigan at 3-15 m near the J. H. Campbell Plant. Standard error denoted by vertical bar (n = 6). Inner region = treatment area near present thermal discharge, intermediate and outer regions = reference areas.

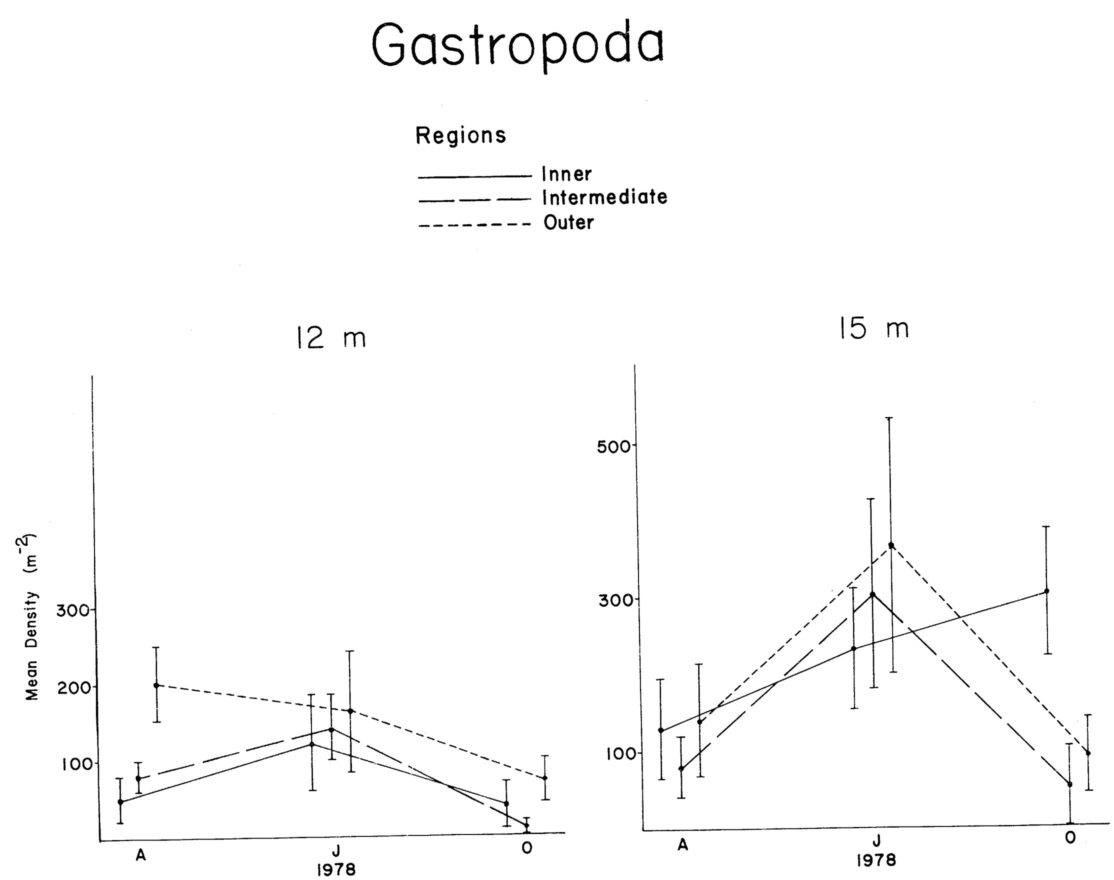

Fig. 12. Continued.

STATISTICAL ANALYSIS OF SELECTED BENTHIC MACROINVERTEBRATES

Major groups of benthic macroinvertebrates were analyzed to determine if distributional differences existed between regions at a particular depth in the preoperational survey (Fig. 1). The analysis of variance (ANOVA) null hypothesis assumes that mean densities and variances among regions at a particular depth were similar. If the null hypothesis is proven correct for any major group of benthic macroinvertebrates tested, then it is concluded that at a particular depth samples were taken from a homogeneous population.

Analysis of the temporal dimension of the first year preoperational data was not performed due to the nature of our preoperational and operational survey design. Based on the present survey design, future analysis will consist of regional ratio comparisons, a nested multi-way ANOVA and its statistical power following the method of Johnston (1974) for the D. C. Cook Plant. Using Johnston's method, comparisons of regions in each month across years will test for regional changes between preoperational and operational years for each month. Since benthic organisms exhibit univoltine, multivoltine or multi-year life-cycles, the average number of organisms collected in each month varies significantly depending upon the time of year the collection was made. Comparisons of regions by months would add large amounts of variance to the analyses due to life cycle patterning and yield no significant information related to the purpose of this study. Therefore, the time factor (months) was pooled in the present analysis and will be of concern only when more than 1 yr of data become available. It is the thrust of the present analysis to concentrate on determining if differences existed between regions at a particular depth in the temporally pooled data.

Since nearly all major benthic macroinvertebrate groups occurred, at least

sparingly, at all depths sampled, it was necessary to establish a criterion to determine depths at which abundances were important for statistical analysis. The following method was used. Probability of occurrence of a given taxon at any particular depth was determined by multiplying two percentages together. The first number is the percentage derived by dividing mean density of any benthic group at a depth by the mean total animal density. The second percentage is the mean density of the benthic group at a depth divided by its sum total across all depths (Table 6). It was decided that any benthic group would be designated as marginal and not be considered in subsequent statistical analysis if it did not have the following properties: at least a percent occurrence of 5% in either of the two categories defined above such that the product of the two categories exceeded 0.0025 (0.05 x 0.05).

TABLE 6. Mean density (numbers m^{-2}) of major taxonomic groups at each depth sampled in 1978 (n = 54) from eastern Lake Michigan near the J. H. Campbell Plant. Sum total across depths refers to each taxa summed over depths sampled.

Taxa	Depth 3 m	6 m	9 m	12 m	15 m	Sum Total Across Depths
S. heringianus	0	0	11	17	744	772
P. hoyi	5	35	781	2268	4928	8017
Chironomidae	855	2812	3363	2714	1190	10934
Naididae	57	689	2001	1976	830	5553
Tubificidae	2	138	1362	1448	1488	4438
Gastropoda	0	3	25	98	189	315
Pisidium	0	12	146	313	916	1387
Total Animals at each Depth	1148	3727	7862	9153	10794	-

Exceptions to the above occurred, however. While most taxa at a particular depth fit the criterion, a few taxa which did not meet the above criterion at certain depths were also included in the analysis because of their ecological importance, e.g., gastropods and Pisidium. Turbellarians were not included in the analysis due to concerns pertaining to sampling efficiency (small individuals) and inconsistent recognition by technicians sorting samples. Comparisons of 1978 and 1979 turbellarian data will be made to determine if temporal and spatial distributions were similar.

Using the above criterion, the main population for each major benthic taxon near the Campbell Plant was analyzed according to the following taxa and depths: chironomids (3, 6, 9, 12 and 15 m), naidids (6, 9, 12 and 15 m), tubificids (9, 12 and 15 m), P. hoyi (9, 12 and 15 m), Pisidium (9, 12 and 15 m), gastropods (12 and 15 m), S. heringianus (15 m) and total animals (3, 6, 9, 12 and 15 m) (Table 7).

TABLE 7. Based on values from TABLE 6, probability of occurrence was determined for major taxonomic groups at each depth sampled during 1978 in eastern Lake Michigan near the J. H. Campbell Plant. When the probability of occurrence for any major taxonomic group was less than 0.0025 at any given depth, the portion of the population occurring at that depth was designated as marginal and not considered in further statistical analysis (see text, p. 56, for details).

Taxa	Depth				
	3 m	6 m	9 m	12 m	15 m
S. heringianus	0	0	<0.0000	<0.0000	0.0664
P. hoyi	<0.0000	<0.0000	0.0097	0.0701	0.2806
Chironomidae	0.0582	0.1940	0.1299	0.0736	0.0120
Naididae	0.0005	0.0229	0.0906	0.0768	0.0115
Tubificidae	<0.0000	0.0012	0.0532	0.0522	0.0467
Gastropoda	0	<0.0000	0.0003	0.0029	0.0092
Pisidium	0	<0.0000	0.0020	0.0072	0.0523

Analysis of total animals, naidids, tubificids, *S. heringianus*, *P. hoyi* and gastropods indicated that assumptions of equality of variances (homoscedasticity) and normally distributed populations were maintained across regions at any particular depth when the $(X + 0.5)^{1/2}$ transformation was used (Table 8) (Elliot 1971). Since chironomids at 6, 9, 12 and 15 m and *Pisidium* at 15 m did not sustain parametric ANOVA assumptions (Table 8), they were analyzed using a nonparametric ANOVA.

ANOVA for total animals (3, 6, 9, 12 and 15 m), *P. hoyi* (9, 12 and 15 m) and naidids (6, 9, 12 and 15 m) indicated there were no significant region effects nor any significant depth/region interactions; however, there were significant depth effects (Tables 9-11). Tubificids and gastropods had no significant depth or region effects or depth/region interactions (Tables 12 and 13).

Multiple comparisons of depths within groups having significant depth effects followed the Student-Newman-Keuls (*a posteriori*) least significant range test (LSR) from Sokal and Rohlf (1969). All depths had significantly different mean densities for both total animals (3, 6, 9, 12 and 15 m) and *P. hoyi* (9, 12 and 15 m) (Fig. 13). Naidid densities were similar at 9 and 12 m and differed significantly from lowest densities observed at 6 and 15 m, which also were significantly different from each other (Fig. 13).

Nonparametric analyses of chironomid and *Pisidium* mean densities were performed using Kruskal-Wallis multiple sample comparisons. If differences were observed among regions for either taxa, the Mann-Whitney U test was used to compare strata in a pairwise fashion to determine which regions at a particular depth were dissimilar. Kruskal-Wallis multiple comparisons indicated that there were no significant differences in *Pisidium* mean densities

TABLE 8. Univariate analysis of variance testing equality of means and variances among regions at each depth for major benthic taxa collected in 1978 from eastern Lake Michigan near the J. H. Campbell Plant using $(X + 0.5)^{1/2}$ transformation. * = significance at 0.05.

Taxon	Depth(m)	Equality of Means df	Equality of Means F-Statistic	Equality of Means Signif.	Equality of Variances df	Equality of Variances F-Statistic	Equality of Variances Signif.
Pontoporeia hoyi	9	2,51	1.86	0.17	2,5852	1.65	0.19
	12	2,51	0.33	0.72	2,5852	0.24	0.79
	15	2,51	0.94	0.40	2,5852	1.15	0.32
Chironomidae	3	2,51	1.01	0.37	2,5852	0.27	0.77
	6	2,51	0.37	0.69	2,5852	3.51	0.03*
	9	2,51	3.68	0.03*	2,5852	0.83	0.43
	12	2,51	3.59	0.03*	2,5852	1.34	0.26
	15	2,51	1.13	0.33	2,5852	5.15	0.01*
Naididae	6	2,51	0.97	0.38	2,5852	0.60	0.55
	9	2,51	0.31	0.74	2,5852	0.38	0.68
	12	2,51	1.81	0.17	2,5852	0.43	0.65
	15	2,51	1.40	0.26	2,5852	0.67	0.51
Tubificidae	9	2,51	0.39	0.68	2,5852	0.88	0.42
	12	2,51	2.44	0.10	2,5852	1.05	0.35
	15	2,51	0.20	0.82	2,5852	0.52	0.59
Gastropoda	12	2,51	2.10	0.13	2,5852	0.59	0.55
	15	2,51	1.35	0.27	2,5852	0.90	0.41
Pisidium	9	2,51	0.03	0.97	2,5852	0.43	0.65*
	12	2,51	1.54	0.22	2,5852	1.05	0.35
	15	2,51	0.02	0.98	2,5852	4.12	0.02*
Total Animals	3	2,51	0.27	0.76	2,5852	0.90	0.41
	6	2,51	0.21	0.81	2,5852	2.12	0.12
	9	2,51	0.85	0.43	2,5852	0.32	0.73
	12	2,51	1.73	0.19	2,5852	1.19	0.30
	15	2,51	0.12	0.89	2,5852	1.19	0.31

TABLE 9. Multi-way analysis of variance among regions and depths using $(X + 0.5)^{1/2}$ transformation for total animal density. Animals were collected during 1978 from eastern Lake Michigan near the J. H. Campbell Plant. * = significance at 0.05.

Source	df	SS	MS	F_s	Signif.
Depth(D)	4	199678.48	49919.62	60.86	*
Region(R)	2	603.54	301.77	0.37	NS
Interaction(D x R)	8	3957.29	494.66	0.60	NS
Error	255	209143.43	820.17		
Total	269	413382.74			

TABLE 10. Multi-way analysis of variance among regions and depths using $(X + 0.5)^{1/2}$ transformation for *Pontoporeia hoyi* mean density. Animals were collected during 1978 from eastern Lake Michigan near the J. H. Campbell Plant. * = significance at 0.05.

Source	df	SS	MS	F_s	Signif.
Depth(D)	2	39733.35	19866.67	28.73	*
Region(R)	2	3096.84	1548.42	2.24	NS
Interaction(D x R)	4	373.45	93.36	0.13	NS
Error	153	105814.89	691.60		
Total	161	149018.53			

TABLE 11. Multi-way analysis of variance among regions and depths using $(X + 0.5)^{1/2}$ transformation for Naididae mean density. Animals were collected during 1978 from eastern Lake Michigan near the J. H. Campbell Plant. * = significance at 0.05.

Source	df	SS	MS	F_s	Signif.
Depth(D)	3	16131.71	5377.24	14.67	*
Region(R)	2	1907.50	953.75	2.60	NS
Interaction(D x R)	6	1271.68	211.95	0.58	NS
Error	204	74751.81	366.43		
Total	215	94062.70			

TABLE 12. Multi-way analysis of variance among regions and depths using $(X + 0.5)^{1/2}$ transformation for Tubificidae mean density. Animals were collected during 1978 from eastern Lake Michigan near the J. H. Campbell Plant. * = significance at 0.05.

Source	df	SS	MS	F_s	Signif.
Depth(D)	2	288.45	144.23	0.43	NS
Region(R)	2	740.24	370.12	1.11	NS
Interaction(D x R)	4	968.61	242.15	0.73	NS
Error	153	50830.70	332.23		
Total	161	52828.00			

TABLE 13. Multi-way analysis of variance among regions and depths using $(X + 0.5)^{1/2}$ transformation for Gastropoda mean density. Animals were collected during 1978 from eastern Lake Michigan near the J. H. Campbell Plant. * = significance at 0.05.

Source	df	SS	MS	F_s	Signif.
Depth(D)	1	225.03	225.03	3.79	NS
Region(R)	2	101.47	50.73	0.85	NS
Interaction(D x R)	2	278.56	139.28	2.34	NS
Error	102	6063.92	59.45		
Total	107	6668.98			

Total Animals

Depth	3 m	6 m	9 m	12 m	15 m
Mean density	27.98	49.90	86.27	91.55	98.59

Naididae

Depth	6 m	15 m	12 m	9 m
Mean density	18.70	21.14	38.41	39.34

P. hoyi

Depth	9 m	12 m	15 m
Mean density	23.50	39.90	61.73

Fig. 13 . Student-Neuman-Keuls multiple comparison of depths for major taxonomic groups collected in 1978 from eastern Lake Michigan near the J. H. Campbell Plant. Only taxa with significant effects based on analysis of variance were used. Mean densities derived from appropriate ANOVA cell means based on square root transformation. $\alpha = 0.05$.

between regions at 9, 12 or 15 m, but there were significant regional mean density differences for chironomids at 9 and 12 m (Tables 14 and 15).

TABLE 14. Kruskal-Wallis multiple sample comparisons of mean density among regions at each depth sampled for *Pisidium* in 1978 from eastern Lake Michigan near the J. H. Campbell Plant. * = significance at 0.05.

Depth(m)	df	K-Stat.	Signif.
9	2	0.23	0.89
12	2	3.64	0.16
15	2	0.51	0.78

TABLE 15. Kruskal-Wallis multiple sample comparisons of mean density among regions at each depth sampled for Chironomidae in 1978 from eastern Lake Michigan near the J. H. Campbell Plant. * = significance at 0.05.

Depth(m)	df	K-Stat.	Signif.
3	2	2.45	0.29
6	2	0.28	0.87
9	2	7.46	0.02*
12	2	6.91	0.03*
15	2	2.00	0.37

Chironomids at 9 and 12 m in the inner region were significantly less dense than in either intermediate or outer regions at similar depths, where chironomid densities were not significantly different from each other (Table 16). At 9 m, three chironomid taxa, *Paracladopelma camptolabis*-gr., *Polypedilum* cf. *scalaenum* and *Cladotanytarsus* sp. were the most numerous chironomids in all three regions, comprising 59-64% of total chironomids. *Saetheria* cf. *tylus*, *P. camptolabis*-gr. and *P.* cf. *scalaenum* were the most abundant chironomids at 12 m, comprising a similar percentage of total chironomids in all three regions (50-58%).

Analysis of the three major chironomid taxa at 9 m in each region indicated no significant differences among regions for the dominant forms (Table 17). However, at 12 m there appeared to be a significant increase in *P.* cf. *scalaenum* density as distance from the plant became greater. Outer region *P.* cf. *scalaenum* density was significantly greater than that observed in the inner region. *P.* cf. *scalaenum* density in the intermediate region was not

TABLE 16. Mann-Whitney U test for pairwise comparisons of chironomid mean densities among regions at depths sampled where significant regional differences were observed. Chironomids were collected during 1978 from eastern Lake Michigan near the J. H. Campbell Plant. * = significance at 0.05.

Depth(m)	Regional Comparison	Mann-Whitney U	Signif.
9	Inner vs Inter	96.50	0.04
9	Inner vs Outer	81.50	0.01
9	Inter vs Outer	144.50	0.58
12	Inner vs Inter	100.00	0.05
12	Inner vs Outer	85.50	0.02
12	Inter vs Outer	137.50	0.44

TABLE 17. Kruskal-Wallis multiple sample comparisons of mean density among regions for the three most numerous chironomid taxa at 9 and 12 m in eastern Lake Michigan near the J. H. Campbell Plant, 1978. * = significance at 0.05.

Taxon	Depth(m)	df	K-Stat.	Signif.
Cladotanytarsus sp.	9	2	3.78	0.15
Paracladopelma camptolabis-gr.	9	2	1.52	0.47
Polypedilum cf. *scalaenum*	9	2	3.55	0.17
Saetheria cf. *tylus*	12	2	1.11	0.57
Paracladopelma camptolabis-gr.	12	2	2.44	0.30
Polypedilum cf. *scalaenum*	12	2	7.45	0.02*

significantly different from either inner or outer regions (Table 18). Since there were no measurable differences between regions at 12 m for other major chironomid taxa, *P. hoyi*, *Pisidium* , tubificids, naidids or gastropods, we can assign no clear reasons for differences observed in *P.* cf. *scalaenum* densities.

TABLE 18. Mann-Whitney U test for pairwise comparisons of mean density among regions for *Polypedilum* cf. *scalaenum* densities observed at 12 m in eastern Lake Michigan near the J. H. Campbell Plant, 1978. * = significance at 0.05.

Regional Comparison	Mann-Whitney U	Signif.
Inner vs Inter	114.50	0.13
Inner vs Outer	78.50	0.01*
Inter vs Outer	119.00	0.17

Heterogeneity of variance was observed for chironomid data at 6 and 15 m and *Pisidium* data at 15 m. Whereas variance of chironomids at 6 m in the inner region was 2 to 3 times greater than that observed in either intermediate or outer regions, variance at 15 m in the intermediate region was 2 to 5 times greater than in the inner and outer regions. For *Pisidium* at 15 m, inner region variation was 3 to 4 times less than variances observed in intermediate and outer regions. With respect to those taxa having inherent heterogeneous distributions, these observations displayed no consistent variability trends where one region was more variable or less variable when compared to other regions in 1978 at the Campbell Plant.

Based on 1978 preoperational data, most major taxonomic groups encountered near the Campbell Plant showed no significant regional differences and no significant interactions between depths and regions, but there were significant depth effects as expected. Testing for differences across depths was not the purpose of the study and will not serve as an indicator of plant effects because little currently is known pertaining to factors controlling depth distributions of individual benthic taxa. Mozley and Garcia (1972) described a series of habitat types proceeding offshore. While depth was an important

factor controlling the distribution of benthos, other factors acting in conjunction with depth, e.g., temperature, light penetration, wave activity and currents, also affect the location of benthos. Stimpson (1975) has shown some relation of oligochaetes to sediment type and depth. Marzolf (1965) indicated P. hoyi had no depth preference near Grand Traverse Bay but instead were located in sediments coated with bacteria and having a certain phi size range. In most benthic surveys, depth is the only component consistently measured. Consequently, depth dominates most other components due to lack of consistent measurement of other physical and biological factors and subsequent lack of ecological knowledge of how physical and biological factors alter benthic distributions. As a result, any attempt to measure changes across depths within a single year would not lead to any clear and interpretable results and conclusions. However, depth may be an important factor when more than one year of data become available.

Measurements of change or detection of difference made on the basis of alongshore differences between the inner, intermediate and outer regions at each individual depth for specified taxa, indicated populations of P. hoyi (9, 12 and 15 m), naidids (6, 9, 12 and 15 m), tubificids (9, 12 and 15 m), S. heringianus (15 m), gastropods (12 and 15 m) and total animals (3, 6, 9, 12 and 15 m) were distributed homogeneously across the regions examined at each depth sampled. No significant differences in mean densities or variance were observed for these major taxonomic groups. Only among chironomids (6, 9, 12 and 15 m) and Pisidium (9, 12 and 15 m) were significant differences in mean densities and/or variances observed. Differences observed did not indicate any interpretable ecological patterns lending themselves to an evaluation of regional differences.

SEDIMENT DISTRIBUTION PATTERNS

Analysis of sediment samples taken during April, July and October 1978 at 3, 6, 9, 12 and 15 m near the Campbell Plant indicated sediment textures in the survey area were dependent primarily upon depth, then time and least upon region. Although depth, time and region factors will not be discussed individually, each will be discussed as they pertain to prominent features of the sediment dataset, particularilly when they differ from common sediment distribution patterns observed.

For each region and depth sampled during any particular month, average mean and standard deviation moment measure statistics ranged 1.25-2.76 and 0.41-0.95, respectively (Tables 19, 20 and 21). Most sediments from the survey area were well to moderately sorted (measure of homogeneity of sediment distribution among sediment grain sizes) fine sand (Tables 19-21). While this suggested uniform sediments in the survey area, there were depth-related changes in sediment composition as measured by standard deviation of mean grain size and percent distribution of sediments (by phi size) across the observed mean phi range -3 to +5. Generally, sorting of sediments (the lower the sorting value the more homogeneous the sediment type) was best at 3 m. Most average sorting measures were in the 0.50-0.59 range. Sorting observed at other depths was noticeably poorer than that observed at 3 m, with values usually in the range 0.60-0.80. The greatest degree of variability in the sorting measure at a specific depth was present at 6 m. Compared to other depths, sorting measures were intermediate at 9 m and similar between 12- and 15-m depths but comparatively poorer than those at 3 and 9 m.

Percent distribution of sediments among the various mean phi ranges further suggested that a wave/current-induced physical process was interacting

TABLE 19. Average percent composition of sediments distributed among sediment grain sizes, average mean grain size and average standard deviation of mean grain size (n = 6) for sediments collected in 1978 at 3-15 m in the inner (treatment area near present thermal discharge), intermediate and outer (reference areas) regions near the J. H. Campbell Plant, eastern Lake Michigan. SD = standard deviation.

		April										
		Percentage of sediment grain sizes (phi units)									Moment measure statistics (phi units)	
Region	Depth (m)	<-3	-3--2	-2--1	-1-0	0-1	1-2	2-3	3-4	4-5	Mean	SD
Inner	3			0.02	0.13	2.87	54.63	41.56	0.48	0.31	1.90	0.56
Inter	3				0.08	1.09	30.88	67.11	0.67	0.19	2.17	0.50
Outer	3		0.03	0.07	0.22	1.24	36.39	61.42	0.59	0.04	2.11	0.54
Inner	6			0.03	0.45	5.13	24.04	68.09	2.05	0.20	2.17	0.57
Inter	6		1.54	3.62	8.60	24.67	27.57	33.48	0.40	0.13	1.25	0.82
Outer	6		1.21	3.84	8.21	20.44	12.55	51.48	2.13	0.13	1.53	0.78
Inner	9		0.03	0.13	0.46	2.10	8.24	69.64	19.06	0.34	2.54	0.65
Inter	9			0.12	1.05	5.82	5.80	74.42	12.61	0.18	2.42	0.67
Outer	9			0.03	0.06	0.27	3.19	84.38	11.97	0.11	2.58	0.41
Inner	12		0.06	0.06	0.22	2.74	21.03	53.82	21.80	0.28	2.44	0.71
Inter	12			0.11	0.24	1.03	10.51	62.23	25.44	0.45	2.61	0.65
Outer	12			0.11	0.25	1.59	12.45	58.93	26.24	0.43	2.59	0.69
Inner	15		0.02	0.09	0.18	1.15	12.10	43.65	42.05	0.76	2.76	0.75
Inter	15		0.03	0.06	0.09	0.73	15.55	58.36	24.86	0.44	2.57	0.66
Outer	15		0.41	1.52	4.47	18.67	28.53	25.04	20.91	0.47	1.83	0.82

TABLE 20. Average percent composition of sediments distributed among sediment grain sizes, average mean grain size and average standard deviation of mean grain size (n = 6) for sediments collected in 1978 at 3-15 m in the inner (treatment area near present thermal discharge), intermediate and outer (reference areas) regions near the J. H. Campbell Plant, eastern Lake Michigan. SD = standard deviation.

July												
		Percentage of sediment grain sizes (phi units)									Moment measure statistics (phi units)	
Region	Depth(m)	<-3	-3--2	-2--1	-1-0	0-1	1-2	2-3	3-4	4-5	Mean	SD
Inner	3			0.08	0.76	4.62	25.42	55.79	11.90	1.44	2.23	0.68
Inter	3			0.02	0.10	1.70	46.66	50.42	1.01	0.11	2.01	0.55
Outer	3			0.05	0.08	1.35	51.29	46.86	0.34	0.02	1.96	0.54
Inner	6		0.04	0.15	1.62	13.07	16.50	60.82	5.72	2.09	2.06	0.71
Inter	6		0.03	0.18	1.31	14.73	24.32	55.83	3.40	0.21	1.95	0.70
Outer	6			0.37	2.31	5.11	4.58	81.17	6.37	0.10	2.33	0.56
Inner	9			0.09	0.25	0.96	7.70	69.04	21.61	0.36	2.61	0.60
Inter	9			0.09	0.23	1.41	13.06	67.37	17.65	0.18	2.50	0.60
Outer	9	0.16		0.03	0.15	0.87	9.11	72.99	16.57	0.12	2.54	0.60
Inner	12			0.18	0.90	7.55	26.53	41.40	23.23	0.21	2.28	0.69
Inter	12			0.02	0.11	0.61	13.99	60.56	24.50	0.21	2.59	0.65
Outer	12			0.01	0.10	1.09	20.54	59.21	18.74	0.32	2.46	0.64
Inner	15		0.04	0.04	0.30	2.04	23.54	46.73	27.00	0.32	2.48	0.73
Inter	15		0.02	0.28	1.01	7.75	45.14	33.82	11.84	0.13	1.97	0.63
Outer	15		0.13	0.15	1.08	8.25	28.86	32.34	28.88	0.32	2.29	0.71

TABLE 21. Average percent composition of sediments distributed among sediment grain sizes, average mean grain size and average standard deviation of mean grain size (n = 6) for sediments collected in 1978 at 3-15 m in the inner (treatment area near present thermal discharge), intermediate and outer (reference areas) regions near the J. H. Campbell Plant, eastern Lake Michigan. SD = standard deviation.

		October										
		Percentage of sediment grain sizes (phi units)									Moment measure statistics (phi units)	
Region	Depth(m)	<-3	-3--2	-2--1	-1-0	0-1	1-2	2-3	3-4	4-5	Mean	SD
Inner	3			0.01	0.10	0.66	13.20	66.37	16.74	2.90	2.49	0.57
Inter	3				0.03	1.08	38.15	57.90	2.55	0.30	2.12	0.54
Outer	3				0.03	0.63	20.90	75.01	2.84	0.58	2.30	0.44
Inner	6	0.35	0.81	1.93	7.44	26.24	15.39	42.45	4.80	0.63	1.50	0.95
Inter	6		0.06	0.41	2.05	21.70	25.45	44.88	4.80	0.66	1.77	0.75
Outer	6		0.01	0.01	0.07	1.10	3.83	86.95	6.98	1.06	2.50	0.41
Inner	9		0.03	0.02	0.16	0.96	8.10	62.18	27.70	0.85	2.66	0.63
Inter	9		0.03	0.17	0.37	0.96	5.70	67.56	24.37	0.86	2.64	0.63
Outer	9		0.05	0.18	0.32	1.67	11.28	61.14	24.79	0.47	2.58	0.69
Inner	12		0.01	0.42	0.41	1.45	14.37	49.04	33.14	1.17	2.62	0.78
Inter	12			0.07	0.18	0.90	12.81	53.80	31.55	0.70	2.65	0.69
Outer	12			0.02	0.13	1.10	15.23	52.09	30.82	0.63	2.63	0.70
Inner	15			0.17	1.02	10.54	31.59	37.88	18.36	0.46	2.11	0.73
Inter	15			0.02	0.06	0.98	15.95	57.19	25.26	0.55	2.57	0.65
Outer	15			0.07	0.21	1.19	23.44	49.72	24.80	0.57	2.47	0.69

with the benthic environment in the survey area. As previously mentioned, the primary sediment type in the survey area was fine sand. However, secondary sand components, e.g., coarse, medium and very fine sand, distinguished the 3 to 15-m depths sampled. At 3 m, besides fine sand, medium sand was the only other major sediment component (i.e. greater than 10%) consistently present in samples. Coarse and medium sands were major sediment components occurring regularly in samples at 6 m. A shift in percent distribution of sediments more extreme than that observed from 3 to 6 m was noted from 6 to 9 m where the first regular occurrence of very fine sands as a major sediment component was observed. Only sporadic major occurrences of medium sand were present at 9 m. This trend was evident during all months, thereby appearing to be a permanent sediment distribution pattern in the survey area. Major sediment components at 12 and 15 m were similar and included both medium and very fine sands in addition to fine sand as regularly occurring major sediment components.

Waves, currents and occasional storms in the lake are the most suspect physical processes likely to affect sediment distribution patterns. The effect of these processes was evident at all depths sampled. Well sorted, fine and medium sands suggested the highest energy environment occurred at 3 m. Sediments from all other depths were moderately sorted and, coupled with varying percent occurrence of primary and secondary sediment components, indicated decreasing and less consistent energy input into the benthic environment from the physical processes noted above. Decreased energy was particularly evident at 9, 12 and 15 m where very fine sands began to be deposited. Generally less than 1% silt and no clay were present at any station indicating there was sufficient energy in the 3 to 15-m environment to carry the bulk of these sediment types to depths greater than 15 m before deposition

occurred. Occasional occurrences of coarse sand at 15 m suggested that the suspected morainal protrusion at the 20-m depth contour near the Campbell Plant (Jude et al. 1978) may extend shoreward. Since it has been observed that the moraine layer at 20 m reduced benthic abundances (Jude et al. 1978), interpretation of future benthic and sediment distribution patterns may be complicated at 15 m if samples were collected shortly after coarse sediments were uncovered due to storm activity. No estimate of time necessary to cover the coarse material with finer-sized sediment and to reestablish the normal animal distribution can be made. It appears likely, however, that shoreward extention of the moraine is minimal, but it nevertheless will add variance to the data.

Presence of a wide range of sand types (very coarse to fine sands) and sorting measures indicated the most complex interaction of physical processes and benthic environment occurred at 6 m when compared to other depths sampled. Anchoring of ice ridges into sand bars during the winter, followed by subsequent interaction of spring ice break-up and spring storms, may have removed enough of the finer-sized sediments to expose underlying coarser-sized sediments. As measured by percentage of sediments coarser than medium sand present among sediment types, the effect of this process was most extreme during April (26%), followed by October (20%) and was least extreme in July (13%). When compared to April and October sediments, presence of finer sediments at 6 m during July suggested deposition of finer sediments occurred from April to July which may have covered the coarse material. Subsequent storm activity in the fall apparently removed finer sediments, again exposing coarse sediments.

Why a greater proportion of coarser sediment types was not observed at 3 m

during the three sampling dates is not known since shallower depths should experience greater impact from wave and ice-ridge activity. Ice ridges associated with sand bars at depths shallower than 6 m have been documented by Seibel (1975). Seibel (personal communication, Department of Geology, San Francisco State University, San Francisco, Calif.) indicated that exact location of sand bars and ice barriers is variable from year to year dependent upon wave and storm activity and harshness of the winter. Three ice ridges near the D. C. Cook Plant, southeastern Lake Michigan, were located at approximately <1 m, 2-3 m and 4-6 m. Ice ridges located in shallower water occurred more permanently and regularly during winter each year than ice ridges in deeper waters. While it was possible that the 6-m depth near the Campbell Plant was more closely associated with an ice ridge than the 3-m depth, this pattern did not conform to expected ice ridge occurrence. Thus, suspected wave and ice ridge activity did not appear to fully explain differences between observed sediment type distributions at 3 and 6 m in 1978. No definitive conclusions can be drawn at present. Studies with these processes as the focus would further elucidate a complex interaction of waves, currents and ice barriers within the benthic environment.

While the general sediment distribution pattern had no monthly trends, during July and October at 3 m in the inner region, an increase in the percent composition of very fine sand and silt was observed when compared to the same depth and region in April. Since construction activities in the area near the Campbell Plant began between the April and July sampling periods, presence of sediments in the inner region that were finer than those in the intermediate and outer regions suggests construction activities may have had some effect on sediment composition in the inner region at 3 m. Noticeably finer sediments

were not found at remaining depths in the inner region when compared to intermediate and outer regions at similar depths. In addition there were no apparent regional animal density differences associated with the occurrence of finer sediments when comparing major taxonomic groups at 3 m between the inner region and the intermediate and outer regions. However, with increased dredging in the inner survey area, continued sediment analysis will aid interpretations pertaining to any future animal density differences observed between the inner and the intermediate and outer regions with respect to depths sampled. While mean phi varied little because the major component of the sediments was fine sand, presence of coarser or finer sediment sizes suggested the possibility of a storm, wave, current and ice-related physical process not obvious by observing mean phi and total percentages of gravel, sand, silt or clay. Depth appeared to be the factor accounting for most variation in observed sediment distribution patterns. Generally, monthly and regional changes in sediment distribution patterns were less extreme than was observed for depth. Possible construction effects in the inner region at 3 m and seasonal effects associated with a complex set of lake-related wave, current, storm and ice activities suggested these possible causal factors should not be disregarded. Future interpretation of animal distribution pattern differences will be enhanced by the awareness sediment analysis provides regarding depth, monthly and regional variations in sediment distribution patterns.

SUMMARY

The 1978 benthos/sediment survey near the J. H. Campbell Plant was based on 30 stations located at 3, 6, 9, 12 and 15 m along six transects in three regions. Regions were established to test for preoperational animal density differences designated as inner, intermediate and outer, which may relate to future intake/discharge effects. The two transects in the inner region corresonded to the treatment area near the present thermal discharge. Two transects in each of the intermediate and outer regions were established as reference areas. Three monthly surveys were conducted in 1978 during April, July and October. Three replicates for benthic macroinvertebrates and sediments were collected at each station during each month, yielding a yearly sample size of 270 ponar grabs. Six replicates were used to estimate benthic macroinvertebrate densities and sediment types at each region and depth location during each month.

Eighty taxa were identified from the 1978 survey in the Campbell area, bringing the 1977 and 1978 total identified taxa to 98. For both years the benthic group having the greatest number of taxa was chironomids with 34, followed by naidids (19), *Pisidium* (16), tubificids (12), gastropods (4) and *Sphaerium* sp. (3). There were 69 taxa identified from the inner and outer regions and 66 taxa in the intermediate region. Greatest diversity through all regions occurred at 9, 12 and 15 m.

Depth and time had a greater impact on the measured densities of benthic macroinvertebrates than did region. However, there were some regional differences which should not be disregarded. Based on the June 1977 survey (Jude et al. 1978), distribution of animals and sediment type corresponded well with the following hypothesis. Briefly, the 3 to 6-m depth zone was considered

a physically controlled environment, largely influenced by wave and storm activity. Because of this, lower numbers of taxa, generally reduced benthic densities and coarser sediments were observed. The 9 to 15-m depth zone was considered a semi-stable environment experiencing less physical stress than the 3 to 6-m depth zone. Stability of the 9 to 15-m zone was likely limited to the length of time between severe storms, currents, seiching activity, temperature and seasonal variations. Characteristic of the 9 to 15-m environment was increased abundance of tubificids, *Pisidium*, gastropods, *Pontoporeia hoyi*, *Stylodrilus heringianus* and deposition of finer sediment types.

Monthly variations were evident particularly with respect to sediment composition, *P. hoyi* density, naidid diversity and tubificid, *P. hoyi* and chironomid life cycle changes. Completion of reproduction and growth of young *P. hoyi* may account for noticeably greater densities in July 1978 compared with April densities. Subsequent susceptibility to fish predation was postulated as a cause for reduced numbers of *P. hoyi* in October.

Most naidid species occurred during July; few were present in April and October. Reasons for this pattern could be related to maturation of naidids to a size catchable by the ponar or retained by the screen size used. Tubificids were maturing between April and July (also noted in surveys from other areas of Lake Michigan) with major reproduction evidently occurring in October.

Regional life cycle differences of tubificids were not noted for the bulk of comparisons and none were observed for chironomid instar comparisons made at any depth or month. The most obvious life cycle difference among regions was observed for *P. hoyi* size classes. *P. hoyi* present in the inner region at 9, 12 and 15 m during April were predominantly 3-mm individuals while those in the outer region were gravid and spent females. These regional size-classes differences were negligible in July and October at 9, 12 and 15 m.

Although there existed a qualitative difference for _P. hoyi_, there was no apparent corroboration as measured by chironomid instar, tubificid maturity proportions or _P. hoyi_ density difference across regions at a given depth and month. Little can be said regarding the stability of these trends until further studies have been completed, thereby permitting yearly comparisons.

Analysis of variance (ANOVA) was performed on time-pooled data for major taxonomic groups at depths where the main body of their respective population occurred. Of major groups meeting the assumptions of the parametric ANOVA, no significant regional effects or depth/region interactions were evident for total animals (3, 6, 9, 12 and 15 m), _P. hoyi_ (9, 12 and 15 m), naidids (6, 9, 12 and 15 m) and _S. heringianus_ (15 m). While depth effects were significant, little importance has been ascribed to this at present since depth effects were expected. Tubificid (9, 12 and 15 m) and gastropod (12 and 15 m) densities showed no significant depth or regional differences or depth/region interactions. Neither _Pisidium_ sp. (9, 12 and 15 m) nor chironomids (3, 6, 9, 12 and 15 m) met the parametric ANOVA assumptions; therefore, they were analyzed for regional differences using nonparametric statistics (Kruskal-Wallis). While no regional effects were observed for _Pisidium_ (9, 12 and 15 m), regional effects were evident for chironomids at 9 and 12 m. Analysis of the three most numerous chironomid taxa at each depth indicated only _Polypedilum_ cf. _scalaenum_ had density differences among regions at 12 m. Since none of the other major taxonomic groups or numerous chironomid taxa had any significant regional effects, no reasons for observed differences in _P._ cf. _scalaenum_ densities among regions have been offered. Overall, 1978 preoperational abundances of major taxonomic groups appeared to be homogeneously distributed among regions based on time-pooled data.

Analysis of sediments indicated sediment texture and composition were primarily dependent upon depth and secondarily upon time and region. As mentioned previously, sediments in the 3 and 6-m depth zone were indicative of a physically controlled, high energy environment. Sediment type in the 9, 12 and 15-m depth zone contained decidedly finer sediment sizes, although coarse sediment types were also present. Little silt and no clay were observed in the survey area. It was speculated that presence of a suspected morainal layer at 20 m may interfere with normal sediment distribution patterns at 15 m after heavy storm activity. In June 1977 it was noted that animal abundance decreased in the coarse sediment types (moraine) at 20 m. Since coarser sediment types were found occasionally at 15 m in 1978, it was speculated that the moraine found at 20 m may lie under the more usual fine sediment types present at 15 m. Thus, if the coarse sediment at 15 m were exposed due to storm activity, low densities of characteristic macrobenthos might occur, thereby confounding interpretations of power plant effects. Construction activity may have caused more fine material to be deposited at 3 m during July and October 1978 than was there, at least in April 1978. Only further observation will document this trend which was not observed at any other depth over the same time period. No effect on animal densities at 3 m was apparent. As measured by percent occurrence of sediment types that were coarser than medium sand, sediment composition during April and October was indicative of increased wave and storm activity. Sediment composition at 3 and 6 m during April and October differed from that observed during July when finer sediments were found. Occurrence of a greater proportion of finer sediments in July was indicative of decreased wave and storm activity. Increased storm activity near vernal equinox periods and spring ice break-up were hypothesized as the major causative agents affecting nearshore sediments.

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APPENDIX 1. Mean densities (number m^{-2}) of *P. hoyi*, miscellaneous taxa and total animals collected during April, July and October 1978 in the inner (treatment area near present thermal discharge), intermediate and outer (reference areas) regions at 3-15 m near the J. H. Campbell Plant, eastern Lake Michigan. In addition to mean and standard error, size classes of *P. hoyi* in each region have been expressed as percentages of total *P. hoyi*. ($\bar{X}$ = mean, S.E. = standard error, n = 6).

MONTH: April DEPTH: 3 meters

Taxa	Inner Region $\bar{X}$	Inner Region S.E.	Inner Region %	Intermediate Region $\bar{X}$	Intermediate Region S.E.	Intermediate Region %	Outer Region $\bar{X}$	Outer Region S.E.	Outer Region %
Total *Pontoporeia hoyi*									
P. hoyi < 3 mm									
P. hoyi 3-5 mm									
P. hoyi 5-7 mm									
P. hoyi > 7 mm									
P. hoyi gravid									
P. hoyi spent									
Miscellaneous Taxa									
Turbellaria	20	13		111	59				
Hydracarina				10	10				
Hydra sp.									
Gammarus sp.									
Total Animals	212	49		242	110				

MONTH: April DEPTH: 6 meters

Taxa	Inner Region $\bar{X}$	Inner Region S.E.	Inner Region %	Intermediate Region $\bar{X}$	Intermediate Region S.E.	Intermediate Region %	Outer Region $\bar{X}$	Outer Region S.E.	Outer Region %
Total *Pontoporeia hoyi*									
P. hoyi < 3 mm									
P. hoyi 3-5 mm									
P. hoyi 5-7 mm									
P. hoyi > 7 mm									
P. hoyi gravid									
P. hoyi spent									
Miscellaneous Taxa									
Turbellaria				121	49				
Hydracarina									
Hydra sp.									
Gammarus sp.									
Total Animals	111	19		364	113		192	90	

APPENDIX 1. Continued.

MONTH: April DEPTH: 9 meters

Taxa	Inner Region $\overline{X}$	Inner S.E.	Inner %	Intermediate Region $\overline{X}$	Intermediate S.E.	Intermediate %	Outer Region $\overline{X}$	Outer S.E.	Outer %
Total *Pontoporeia hoyi*	1040	750		343	272		40	26	
P. hoyi < 3 mm	1020	739	98.1	303	268	88.2	10	10	25.0
P. hoyi 3-5 mm									
P. hoyi 5-7 mm									
P. hoyi > 7 mm				10	10	2.9			
P. hoyi gravid				10	10	2.9	10	10	25.0
P. hoyi spent	20	13	1.9	20	13	5.9	20	20	50.0
Miscellaneous Taxa									
Turbellaria									
Hydracarina									
Hydra sp.									
Gammarus sp.									
Total Animals	4777	1339		4323	1057		4818	616	

MONTH: April DEPTH: 12 meters

Taxa	Inner Region $\overline{X}$	Inner S.E.	Inner %	Intermediate Region $\overline{X}$	Intermediate S.E.	Intermediate %	Outer Region $\overline{X}$	Outer S.E.	Outer %
Total *Pontoporeia hoyi*	737	517		343	142		212	120	
P. hoyi < 3 mm	646	496	87.7	232	125	67.6	71	59	33.3
P. hoyi 3-5 mm				10	10	2.9	10	10	4.8
P. hoyi 5-7 mm									
P. hoyi > 7 mm							10	10	4.8
P. hoyi gravid	30	21	4.1	40	20	11.8	51	33	23.8
P. hoyi spent	61	22	8.2	61	22	17.6	71	29	33.3
Miscellaneous Taxa									
Turbellaria									
Hydracarina									
Hydra sp.									
Gammarus sp.									
Total Animals	3414	1172		6727	749		7444	703	

APPENDIX 1. Continued.

	MONTH: April					DEPTH: 15 meters			
	Inner Region			Intermediate Region			Outer Region		
Taxa	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total *Pontoporeia hoyi*	2646	1139		1606	685		273	131	
P. hoyi < 3 mm	2283	1147	86.3	1202	613	74.8	30	30	11.1
P. hoyi 3-5 mm									
P. hoyi 5-7 mm	10	10	0.4						
P. hoyi > 7 mm									
P. hoyi gravid	162	49	6.1	141	56	8.8	81	53	29.6
P. hoyi spent	192	57	7.3	263	102	16.4	162	96	59.3
Miscellaneous Taxa									
Turbellaria									
Hydracarina									
Hydra sp.				10	10				
Gammarus sp.									
Total Animals	6818	1733		5595	1370		4969	1271	

APPENDIX 1. Continued.

	MONTH: July					DEPTH: 3 meters			
	Inner Region			Intermediate Region			Outer Region		
Taxa	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total *Pontoporeia hoyi*	20	20		20	13				
P. hoyi < 3 mm									
P. hoyi 3-5 mm	10	10	50.0	20	13	100			
P. hoyi 5-7 mm									
P. hoyi > 7 mm	10	10	50.0						
P. hoyi gravid									
P. hoyi spent									
Miscellaneous Taxa									
Turbellaria									
Hydracarina									
Hydra sp.									
Gammarus sp.									
Total Animals	3252	257		1848	200		1879	186	

	MONTH: July					DEPTH: 6 meters			
	Inner Region			Intermediate Region			Outer Region		
Taxa	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total *Pontoporeia hoyi*	81	46		71	29		71	29	
P. hoyi < 3 mm	40	40	50.0	30	21	42.9	30	21	42.9
P. hoyi 3-5 mm	40	40	50.0	40	20	57.1	40	30	57.1
P. hoyi 5-7 mm									
P. hoyi > 7 mm									
P. hoyi gravid									
P. hoyi spent									
Miscellaneous Taxa									
Turbellaria									
Hydracarina	10	10							
Hydra sp.									
Gammarus sp.									
Total Animals	5060	629		4060	591		5585	1016	

APPENDIX 1. Continued.

MONTH: July DEPTH: 9 meters

Taxa	Inner Region $\overline{X}$	Inner Region S.E.	Inner Region %	Intermediate Region $\overline{X}$	Intermediate Region S.E.	Intermediate Region %	Outer Region $\overline{X}$	Outer Region S.E.	Outer Region %
Total Pontoporeia hoyi	1656	288		1555	162		919	59	
P. hoyi < 3 mm	364	104	22.0	414	74	26.6	374	88	40.7
P. hoyi 3-5 mm	1293	206	78.1	1131	167	72.7	545	54	59.3
P. hoyi 5-7 mm				10	10	0.6			
P. hoyi > 7 mm									
P. hoyi gravid									
P. hoyi spent									
Miscellaneous Taxa									
Turbellaria				20	13		10	10	
Hydracarina	40	20		40	20		20	13	
Hydra sp.	10	10					61	22	
Gammarus sp.									
Total Animals	9343	1258		11766	1242		11251	859	

MONTH: July DEPTH: 12 meters

Taxa	Inner Region $\overline{X}$	Inner Region S.E.	Inner Region %	Intermediate Region $\overline{X}$	Intermediate Region S.E.	Intermediate Region %	Outer Region $\overline{X}$	Outer Region S.E.	Outer Region %
Total Pontoporeia hoyi	5292	922		6201	333		4353	289	
P. hoyi < 3 mm	1838	373	34.7	2454	483	39.6	2313	79	53.1
P. hoyi 3-5 mm	3454	576	65.3	3737	414	60.3	2040	279	46.9
P. hoyi 5-7 mm				10	10	0.2			
P. hoyi > 7 mm									
P. hoyi gravid									
P. hoyi spent									
Miscellaneous Taxa									
Turbellaria	81	37		10	10		10	10	
Hydracarina				10	10				
Hydra sp.	20	13		20	13		30	21	
Gammarus sp.									
Total Animals	11766	2299		14978	1541		15423	2528	

APPENDIX 1. Continued.

Taxa	Inner Region $\overline{X}$	Inner Region S.E.	Inner Region %	Intermediate Region $\overline{X}$	Intermediate Region S.E.	Intermediate Region %	Outer Region $\overline{X}$	Outer Region S.E.	Outer Region %
	MONTH: July					DEPTH: 15 meters			
Total *Pontoporeia hoyi*	10373	1156		9141	1224		10878	1508	
P. hoyi < 3 mm	7747	897	74.7	7373	36	80.7	9393	1252	86.3
P. hoyi 3-5 mm	2626	304	25.3	1737	284	19.0	1465	301	13.5
P. hoyi 5-7 mm				20	20	0.2	20	13	0.2
P. hoyi > 7 mm				10	10	0.1			
P. hoyi gravid									
P. hoyi spent									
Miscellaneous Taxa									
Turbellaria	10	10					10	10	
Hydracarina				10	10				
Hydra sp.				20	13				
Gammarus sp.									
Total Animals	13009	1393		16827	3058		17049	3328	

APPENDIX 1. Continued.

Taxa	MONTH: October					DEPTH: 3 meters			
	Inner Region			Intermediate Region			Outer Region		
	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total *Pontoporeia hoyi*									
P. hoyi < 3 mm									
P. hoyi 3-5 mm									
P. hoyi 5-7 mm									
P. hoyi > 7 mm									
P. hoyi gravid									
P. hoyi spent									
Miscellaneous Taxa									
Turbellaria	40	30		677	429		1202	537	
Hydracarina									
Hydra sp.									
Gammarus sp.									
Total Animals	444	119		1000	357		1454	570	

Taxa	MONTH: October					DEPTH: 6 meters			
	Inner Region			Intermediate Region			Outer Region		
	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total *Pontoporeia hoyi*	20	20		20	20		51	24	
P. hoyi < 3 mm									
P. hoyi 3-5 mm	10	10	50.0	20	20	100	51	24	100
P. hoyi 5-7 mm	10	10	50.0						
P. hoyi > 7 mm									
P. hoyi gravid									
P. hoyi spent									
Miscellaneous Taxa									
Turbellaria	51	19		30	30		121	67	
Hydracarina									
Hydra sp.									
Gammarus sp.									
Total Animals	9242	4999		4111	1832		4818	867	

APPENDIX 1. Continued.

MONTH: October DEPTH: 9 meters

Taxa	Inner Region $\overline{X}$	Inner Region S.E.	Inner Region %	Intermediate Region $\overline{X}$	Intermediate Region S.E.	Intermediate Region %	Outer Region $\overline{X}$	Outer Region S.E.	Outer Region %
Total *Pontoporeia hoyi*	505	71		566	125		404	51	
P. hoyi < 3 mm				10	10	1.8	30	21	7.5
P. hoyi 3-5 mm	505	71	100	556	116	98.2	374	36	92.5
P. hoyi 5-7 mm									
P. hoyi > 7 mm									
P. hoyi gravid									
P. hoyi spent									
Miscellaneous Taxa									
Turbellaria	192	65		101	20		798	295	
Hydracarina	10	10					10	10	
Hydra sp.									
Gammarus sp.									
Total Animals	6939	926		7716	621		9827	1208	

MONTH: October DEPTH: 12 meters

Taxa	Inner Region $\overline{X}$	Inner Region S.E.	Inner Region %	Intermediate Region $\overline{X}$	Intermediate Region S.E.	Intermediate Region %	Outer Region $\overline{X}$	Outer Region S.E.	Outer Region %
Total *Pontoporeia hoyi*	1505	168		869	147		899	121	
P. hoyi < 3 mm				10	10	1.2			
P. hoyi 3-5 mm	1485	154	98.7	859	136	98.8	899	121	100
P. hoyi 5-7 mm	20	20	1.3						
P. hoyi > 7 mm									
P. hoyi gravid									
P. hoyi spent									
Miscellaneous Taxa									
Turbellaria	566	121		414	198		879	247	
Hydracarina				20	13				
Hydra sp.									
Gammarus sp.				10	10				
Total Animals	8201	997		6333	981		8090	1346	

APPENDIX 1. Continued.

	MONTH: October					DEPTH: 15 meters			
	Inner Region			Intermediate Region			Outer Region		
Taxa	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%
Total *Pontoporeia hoyi*	3899	679		3353	196		2182	250	
P. hoyi < 3 mm	40	40	1.0	51	19	1.5	30	14	1.4
P. hoyi 3-5 mm	3828	652	98.2	3283	201	97.9	2111	260	96.8
P. hoyi 5-7 mm	30	14	0.8	20	13	0.6	40	26	1.9
P. hoyi > 7 mm									
P. hoyi gravid									
P. hoyi spent									
Miscellaneous Taxa									
Turbellaria	567	266		717	185		859	210	
Hydracarina	51	19		71	36		61	49	
Hydra sp.							10	10	
Gammarus sp.									
Total Animals	10645	2536		12504	3343		9726	2289	

APPENDIX 2. Mean densities (number m^{-2}) of chironomid taxa collected during April, October and July 1978 in the inner (treatment area near present thermal discharge), intermediate and outer (reference areas) regions at 3-15 m near the J. H. Campbell Plant, eastern Lake Michigan. In addition to mean and standard error, chironomid taxa in each region have been expressed as a percentage of total chironomids. ($\bar{X}$ = mean, S.E. = standard error, n = 6).

MONTH: April DEPTH: 3 meters

Taxa	Inner Region $\bar{X}$	Inner Region S.E.	Inner Region %	Intermediate Region $\bar{X}$	Intermediate Region S.E.	Intermediate Region %	Outer Region $\bar{X}$	Outer Region S.E.	Outer Region %
Total Chironomidae	182	50		111	59				
Chironomus sp.									
Chironomus fluviatilis-gr.									
Chironomus halophilus-gr.									
Cryptochironomus sp. 1									
Cryptochironomus sp. 2									
Cryptochironomus sp. 3									
Cryptochironomus cf. *rolli*	10	10	5.6						
Parachironomus cf. *abortivus*									
Paracladopelma cf. *nereis*									
Paracladopelma cf. *undine*									
Paracladopelma camptolabis-gr.									
Paracladopelma cf. *winnelli*									
Robackia cf. *demeijerei*	111	45	61.1	91	62	81.8			
Saetheria cf. *tylus*	10	10	5.6	10	10	9.1			
Polypedilum cf. *scalaenum*									
Polypedilum fallax-gr.									
Polypedilum sp. 2									
Cladotanytarsus sp.	10	10	5.6						
Micropsectra sp.									
Tanytarsus sp.									
Psectrocladius sp.	40	20	22.2						
Cricotopus sp.				10	10	9.1			
Heterotrissocladius cf. *changi*									
Hydrobaenus sp.									
Orthocladius (*O.*) sp. 1									
Orthocladius (*O.*) sp. 2									
Orthocladius (*E.*) sp.									
Parakiefferiella sp.									
Monodiamesa cf. *tuberculata*									
Potthastia cf. *longimanus*									
Procladius sp.									
Others									

APPENDIX 2. Continued.

Taxa	MONTH: April					DEPTH: 6 meters			
	Inner Region			Intermediate Region			Outer Region		
	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Chironomidae	111	19		222	85		131	69	
Chironomus sp.									
Chironomus fluviatilis-gr.	20	13	18.2				61	38	46.2
Chironomus halophilus-gr.									
Cryptochironomus sp. 1									
Cryptochironomus sp. 2							10	10	7.7
Cryptochironomus sp. 3							30	21	23.1
Cryptochironomus cf. rolli	20	13	18.2				10	10	7.7
Parachironomus cf. abortivus									
Paracladopelma cf. nereis									
Paracladopelma cf. undine									
Paracladopelma camptolabis-gr.	10	10	9	10	10	4.5	10	10	7.7
Paracladopelma cf. winnelli									
Robackia cf. demeijerei				162	80	72.7			
Saetheria cf. tylus	20	13	18.2	40	26	18.2			
Polypedilum cf. scalaenum									
Polypedilum fallax-gr.									
Polypedilum sp. 2									
Cladotanytarsus sp.									
Micropsectra sp.									
Tanytarsus sp.									
Psectrocladius sp.	20	13	18.2	10	10	4.5			
Cricotopus sp.									
Heterotrissocladius cf. changi									
Hydrobaenus sp.	20	13	18.2				10	10	7.7
Orthocladius (O.) sp. 1									
Orthocladius (O.) sp. 2									
Orthocladius (E.) sp.									
Parakiefferiella sp.									
Monodiamesa cf. tuberculata									
Potthastia cf. longimanus									
Procladius sp.									
Others									

APPENDIX 2. Continued.

Taxa	MONTH: April						DEPTH: 9 meters		
	Inner Region			Intermediate Region			Outer Region		
	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Chironomidae	2141	524		2656	760		2808	321	
Chironomus sp.	20	20	0.9	61	27	2.3	81	26	2.9
Chironomus fluviatilis-gr.	232	96	10.8	273	75	10.3	253	65	9.0
Chironomus halophilus-gr.									
Cryptochironomus sp. 1									
Cryptochironomus sp. 2	91	34	4.2	81	20	3.0	71	36	2.5
Cryptochironomus sp. 3	30	14	1.4	61	38	2.3	20	13	0.7
Cryptochironomus cf. *rolli*				20	13	0.8	61	27	2.2
Parachironomus cf. *abortivus*				10	10	0.4	10	10	0.4
Paracladopelma cf. *nereis*									
Paracladopelma cf. *undine*									
Paracladopelma camptolabis-gr.	636	143	29.7	596	172	22.4	909	149	32.4
Paracladopelma cf. *winnelli*	10	10	0.5						
Robackia cf. *demeijerei*	20	20	0.9						
Saetheria cf. *tylus*	283	73	13.2	566	325	21.3	677	203	24.1
Polypedilum cf. *scalaenum*	576	216	26.9	505	188	19.0	485	190	17.3
Polypedilum fallax-gr.							10	10	0.4
Polypedilum sp. 2									
Cladotanytarsus sp.	192	79	9.0	465	220	17.5	212	51	7.6
Micropsectra sp.									
Tanytarsus sp.									
Psectrocladius sp.	20	20	0.9						
Cricotopus sp.				10	10	0.4			
Heterotrissocladius cf. *changi*	10	10	0.5						
Hydrobaenus sp.				10	10	0.4	10	10	0.4
Orthocladius (*O.*) sp. 1									
Orthocladius (*O.*) sp. 2									
Orthocladius (*E.*) sp.									
Parakiefferiella sp.	10	10	0.5						
Monodiamesa cf. *tuberculata*	10	10	0.5				10	10	0.4
Potthastia cf. *longimanus*									
Procladius sp.									
Others									

APPENDIX 2. Continued.

MONTH: April DEPTH: 12 meters

Taxa	Inner Region $\overline{X}$	Inner Region S.E.	Inner Region %	Intermediate Region $\overline{X}$	Intermediate Region S.E.	Intermediate Region %	Outer Region $\overline{X}$	Outer Region S.E.	Outer Region %
Total Chironomidae	1394	599		3969	684		4151	579	
Chironomus sp.				20	20	0.5	61	31	1.5
Chironomus fluviatilis-gr.	61	31	4.4	81	30	2.0	71	29	1.7
Chironomus halophilus-gr.									
Cryptochironomus sp. 1							10	10	0.2
Cryptochironomus sp. 2	81	37	5.8	131	36	3.3	131	29	3.2
Cryptochironomus sp. 3				30	21	0.8			
Cryptochironomus cf. rolli	20	13	1.5	40	13	1.0	30	14	0.7
Parachironomus cf. abortivus									
Paracladopelma cf. nereis									
Paracladopelma cf. undine									
Paracladopelma camptolabis-gr.	273	122	19.6	929	234	23.4	848	115	20.4
Paracladopelma cf. winnelli	10	10	0.7						
Robackia cf. demeijerei									
Saetheria cf. tylus	677	391	48.6	1586	196	40.0	1636	234	39.4
Polypedilum cf. scalaenum	121	83	8.7	586	192	14.8	778	155	18.7
Polypedilum fallax-gr.				20	13	0.5	40	20	1.0
Polypedilum sp. 2									
Cladotanytarsus sp.	51	33	3.6	364	161	9.2	364	120	8.8
Micropsectra sp.									
Tanytarsus sp.									
Psectrocladius sp.				10	10	0.3			
Cricotopus sp.	10	10	0.7						
Heterotrissocladius cf. changi				10	10	0.3	30	21	0.7
Hydrobaenus sp.	71	33	5.1	132	50	3.3	111	43	2.7
Orthocladius (O.) sp. 1									
Orthocladius (O.) sp. 2									
Orthocladius (E.) sp.									
Parakiefferiella sp.									
Monodiamesa cf. tuberculata	20	13	1.5	30	21	0.8	30	14	0.7
Potthastia cf. longimanus							10	10	0.2
Procladius sp.									
Others									

APPENDIX 2. Continued.

	MONTH: April					DEPTH: 15 meters			
	Inner Region			Intermediate Region			Outer Region		
Taxa	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Chironomidae	1192	82		1313	348		1980	129	
Chironomus sp.									
Chironomus fluviatilis-gr.	10	10	0.8	10	10	0.8	61	22	3.1
Chironomus halophilus-gr.									
Cryptochironomus sp. 1									
Cryptochironomus sp. 2	40	20	3.4	71	24	5.4	40	26	2.0
Cryptochironomus sp. 3									
Cryptochironomus cf. rolli	10	10	0.8	10	10	0.8	10	10	0.5
Parachironomus cf. abortivus									
Paracladopelma cf. nereis									
Paracladopelma cf. undine									
Paracladopelma camptolabis-gr.	182	63	15.3	152	54	11.5	51	29	2.6
Paracladopelma cf. winnelli	51	24	4.2	10	10	0.8	10	10	0.5
Robackia cf. demeijerei							40	30	2.0
Saetheria cf. tylus	343	51	28.8	667	232	50.8	990	109	50.0
Polypedilum cf. scalaenum	121	27	10.2	141	66	10.8	121	47	6.1
Polypedilum fallax-gr.	61	16	5.1	10	10	0.8	51	24	2.6
Polypedilum sp. 2									
Cladotanytarsus sp.							30	21	1.5
Micropsectra sp.									
Tanytarsus sp.									
Psectrocladius sp.									
Cricotopus sp.									
Heterotrissocladius cf. changi	71	29	5.9	61	31	4.6	10	10	0.5
Hydrobaenus sp.	91	46	7.6	121	52	9.2	485	177	24.5
Orthocladius (O.) sp. 1									
Orthocladius (O.) sp. 2							10	10	0.5
Orthocladius (E.) sp.									
Parakiefferiella sp.									
Monodiamesa cf. tuberculata	212	79	17.8	61	50	4.6	71	59	3.6
Potthastia cf. longimanus									
Procladius sp.									
Others									

APPENDIX 2. Continued.

	MONTH: July					DEPTH: 3 meters			
	Inner Region			Intermediate Region			Outer Region		
Taxa	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Chironomidae	2757	157		1818	205		1879	186	
Chironomus sp.	101	13	3.7	20	13	1.1	30	21	1.6
Chironomus fluviatilis-gr.	1061	127	38.5	293	43	16.1	283	93	15.1
Chironomus halophilus-gr.	20	13	0.7						
Cryptochironomus sp. 1	91	38	3.3	131	51	7.2	191	67	10.2
Cryptochironomus sp. 2				20	13	1.1	30	14	1.6
Cryptochironomus sp. 3							10	10	0.5
Cryptochironomus cf. *rolli*	91	30	3.3	30	21	1.7	10	10	0.5
Parachironomus cf. *abortivus*									
Paracladopelma cf. *nereis*	10	10	0.4	10	10	0.6			
Paracladopelma cf. *undine*	61	41	2.2	101	40	0.6	81	34	4.3
Paracladopelma camptolabis-gr.							10	10	0.5
Paracladopelma cf. *winnelli*	10	10	0.4						
Robackia cf. *demeijerei*	970	171	35.2	646	88	35.6	969	170	51.6
Saetheria cf. *tylus*	303	27	11.0	545	208	30.0	222	56	11.8
Polypedilum cf. *scalaenum*	10	10	0.4						
Polypedilum fallax-gr.									
Polypedilum sp. 2									
Cladotanytarsus sp.									
Micropsectra sp.									
Tanytarsus sp.									
Psectrocladius sp.	30	14	1.1	10	10	0.6	40	20	2.2
Cricotopus sp.									
Heterotrissocladius cf. *changi*									
Hydrobaenus sp.									
Orthocladius (*O.*) sp. 1									
Orthocladius (*O.*) sp. 2									
Orthocladius (*E.*) sp.									
Parakiefferiella sp.									
Monodiamesa cf. *tuberculata*									
Potthastia cf. *longimanus*									
Procladius sp.									
Others				10	10	0.6			

APPENDIX 2. Continued.

	MONTH: July				DEPTH: 6 meters				
	Inner Region			Intermediate Region			Outer Region		
Taxa	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Chironomidae	3081	251		2586	461		3101	465	
Chironomus sp.	192	65	6.2	40	13	1.6	101	66	3.3
Chironomus fluviatilis-gr.	1576	267	51.1	960	305	37.1	869	210	28.0
Chironomus halophilus-gr.									
Cryptochironomus sp. 1	10	10	0.3	10	10	0.4			
Cryptochironomus sp. 2	40	20	1.3	20	13	0.8	61	38	2.0
Cryptochironomus sp. 3									
Cryptochironomus cf. *rolli*									
Parachironomus cf. *abortivus*									
Paracladopelma cf. *nereis*							20	20	0.7
Paracladopelma cf. *undine*	101	34	3.3	162	56	6.3	253	79	8.1
Paracladopelma camptolabis-gr.	81	40	2.6	182	52	7.0	202	53	6.5
Paracladopelma cf. *winnelli*				10	10	0.4	40	13	1.3
Robackia cf. *demeijerei*	707	238	23.0	818	252	31.6	1222	233	39.4
Saetheria cf. *tylus*	212	118	6.9	212	60	8.2	141	37	4.6
Polypedilum cf. *scalaenum*	81	37	2.6	51	29	2.0	121	52	3.9
Polypedilum fallax-gr.									
Polypedilum sp. 2									
Cladotanytarsus sp.	30	14	1.0	40	26	1.6	20	13	0.7
Micropsectra sp.									
Tanytarsus sp.									
Psectrocladius sp.	30	31	1.0	81	37	3.1	40	20	1.3
Cricotopus sp.									
Heterotrissocladius cf. *changi*									
Hydrobaenus sp.									
Orthocladius (*O.*) sp. 1	10	10	0.3				10	10	0.3
Orthocladius (*O.*) sp. 2									
Orthocladius (*E.*) sp.	10	10	0.3						
Parakiefferiella sp.									
Monodiamesa cf. *tuberculata*									
Potthastia cf. *longimanus*									
Procladius sp.									
Others									

APPENDIX 2. Continued.

	MONTH: July					DEPTH: 9 meters			
	Inner Region			Intermediate Region			Outer Region		
Taxa	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%
Total Chironomidae	3060	317		4353	599		4646	404	
Chironomus sp.	10	10	0.3	101	46	2.3			
Chironomus fluviatilis-gr.	687	106	22.4	818	110	18.8	1414	465	30.4
Chironomus halophilus-gr.									
Cryptochironomus sp. 1	10	10	0.3						
Cryptochironomus sp. 2	192	48	6.3	152	54	3.5	192	33	4.1
Cryptochironomus sp. 3									
Cryptochironomus cf. rolli	30	21	1.0						
Parachironomus cf. abortivus	10	10	0.3						
Paracladopelma cf. nereis	10	10	0.3	10	10	0.2			
Paracladopelma cf. undine	20	13	0.7	10	10	0.2	51	29	1.1
Paracladopelma camptolabis-gr.	30	14	1.0	162	53	3.7	152	71	3.3
Paracladopelma cf. winnelli	40	13	1.3	20	13	0.5	40	20	0.9
Robackia cf. demeijerei	444	69	14.5	283	68	6.5	475	96	10.2
Saetheria cf. tylus	40	13	1.3	10	10	0.2	51	19	1.1
Polypedilum cf. scalaenum	394	149	12.9	838	241	19.3	758	197	16.3
Polypedilum fallax-gr.				10	10	0.2			
Polypedilum sp. 2	10	10	0.3						
Cladotanytarsus sp.	859	179	28.1	1495	407	34.3	1242	216	26.7
Micropsectra sp.	10	10	0.3	30	14	0.7	101	37	2.2
Tanytarsus sp.									
Psectrocladius sp.	121	86	4.0	121	59	2.8	51	10	1.1
Cricotopus sp.									
Heterotrissocladius cf. changi	20	13	0.7	101	49	2.3	40	30	0.9
Hydrobaenus sp.				20	13	0.5			
Orthocladius (O.) sp. 1	101	20	3.3	152	38	3.5	40	20	0.9
Orthocladius (O.) sp. 2							10	10	0.2
Orthocladius (E.) sp.									
Parakiefferiella sp.	20	13	0.7				20	20	0.4
Monodiamesa cf. tuberculata				20	13	0.5	10	10	0.2
Potthastia cf. longimanus									
Procladius sp.									
Others									

APPENDIX 2. Continued.

Taxa	MONTH: July						DEPTH: 12 meters		
	Inner Region			Intermediate Region			Outer Region		
	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Chironomidae	2798	1179		2747	435		3969	581	
Chironomus sp.	939	891	33.6	131	83	4.8	51	19	1.3
Chironomus fluviatilis-gr.	91	38	3.2	354	116	12.9	364	104	9.2
Chironomus halophilus-gr.									
Cryptochironomus sp. 1				10	10	0.4			
Cryptochironomus sp. 2							51	10	1.3
Cryptochironomus sp. 3									
Cryptochironomus cf. *rolli*	20	20	0.7						
Parachironomus cf. *abortivus*									
Paracladopelma cf. *nereis*				20	13	0.7	10	10	0.3
Paracladopelma cf. *undine*	20	13	0.7	40	20	1.5	30	21	0.8
Paracladopelma camptolabis-gr.	10	10	0.4	71	24	2.6	61	22	1.5
Paracladopelma cf. *winnelli*	51	19	1.8	51	24	1.8	61	22	1.5
Robackia cf. *demeijerei*	141	30	5.1	61	27	2.2	131	36	3.3
Saetheria cf. *tylus*	81	60	2.9	30	21	1.1	10	10	0.3
Polypedilum cf. *scalaenum*	424	136	15.2	394	196	14.3	848	264	21.4
Polypedilum fallax-gr.							30	21	0.8
Polypedilum sp. 2									
Cladotanytarsus sp.	101	51	3.6	606	134	22.1	293	59	7.4
Micropsectra sp.	465	168	16.6	344	107	12.5	960	273	24.2
Tanytarsus sp.	20	13	0.7				10	10	0.3
Psectrocladius sp.	61	38	2.2	30	14	1.1	81	30	2.0
Cricotopus sp.									
Heterotrissocladius cf. *changi*	152	88	5.4	101	20	3.7	475	242	12.0
Hydrobaenus sp.	91	41	3.2	192	48	7.0	141	84	3.6
Orthocladius (*O.*) sp. 1	10	10	0.4	162	60	5.9	232	43	5.9
Orthocladius (*O.*) sp. 2									
Orthocladius (*E.*) sp.							40	20	1.0
Parakiefferiella sp.	51	40	1.8	91	68	3.3	20	13	0.5
Monodiamesa cf. *tuberculata*	61	22	2.2	51	24	1.8	61	22	1.5
Potthastia cf. *longimanus*									
Procladius sp.				10	10	0.4	10	10	0.3
Others	10	10	0.4						

APPENDIX 2. Continued.

Taxa	MONTH: July			DEPTH: 15 meters					
	Inner Region			Intermediate Region			Outer Region		
	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%
Total Chironomidae	899	159		2414	923		1202	277	
Chironomus sp.	10	10	1.1	61	41	2.5	10	10	0.8
Chironomus fluviatilis-gr.				20	13	0.8			
Chironomus halophilus-gr.									
Cryptochironomus sp. 1									
Cryptochironomus sp. 2	40	13	4.5	10	10	0.4			
Cryptochironomus sp. 3									
Cryptochironomus cf. rolli									
Parachironomus cf. abortivus									
Paracladopelma cf. nereis									
Paracladopelma cf. undine	20	13	2.2						
Paracladopelma camptolabis-gr.	20	20	2.2				10	10	0.8
Paracladopelma cf. winnelli	51	24	5.6				40	30	3.4
Robackia cf. demeijerei	20	13	2.2	10	10	0.4	111	77	9.2
Saetheria cf. tylus	20	13	2.2	10	10	0.4	30	21	2.5
Polypedilum cf. scalaenum	131	57	14.6	40	13	1.7	40	30	3.4
Polypedilum fallax-gr.	40	20	4.5	51	19	2.1	51	29	4.2
Polypedilum sp. 2									
Cladotanytarsus sp.									
Micropsectra sp.	111	63	12.4	949	865	39.3	404	264	33.6
Tanytarsus sp.									
Psectrocladius sp.				20	13	0.8			
Cricotopus sp.									
Heterotrissocladius cf. changi							10	10	0.8
Hydrobaenus sp.	323	135	36.0	1111	442	46.0	414	220	34.5
Orthocladius (O.) sp. 1	20	13	2.2						
Orthocladius (O.) sp. 2									
Orthocladius (E.) sp.									
Parakiefferiella sp.									
Monodiamesa cf. tuberculata	91	30	10.1	131	63	5.4	81	30	6.7
Potthastia cf. longimanus									
Procladius sp.									
Others									

APPENDIX 2. Continued.

	MONTH: October					DEPTH: 3 meters			
	Inner Region			Intermediate Region			Outer Region		
Taxa	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%
Total Chironomidae	404	138		323	82		222	68	
Chironomus sp.									
Chironomus fluviatilis-gr.	40	20	10.0						
Chironomus halophilus-gr.									
Cryptochironomus sp. 1									
Cryptochironomus sp. 2	51	33	12.5						
Cryptochironomus sp. 3	10	10	2.5						
Cryptochironomus cf. rolli	20	13	5.0						
Parachironomus cf. abortivus									
Paracladopelma cf. nereis									
Paracladopelma cf. undine									
Paracladopelma camptolabis-gr.	152	51	37.5	40	30	12.5	71	45	31.8
Paracladopelma cf. winnelli									
Robackia cf. demeijerei	10	10	2.5	71	29	21.9	71	71	31.8
Saetheria cf. tylus	111	63	27.5	212	71	65.6	71	29	31.8
Polypedilum cf. scalaenum	10	10	2.5				10	10	4.5
Polypedilum fallax-gr.									
Polypedilum sp. 2									
Cladotanytarsus sp.									
Micropsectra sp.									
Tanytarsus sp.									
Psectrocladius sp.									
Cricotopus sp.									
Heterotrissocladius cf. changi									
Hydrobaenus sp.									
Orthocladius (O.) sp. 1									
Orthocladius (O.) sp. 2									
Orthocladius (E.) sp.									
Parakiefferiella sp.									
Monodiamesa cf. tuberculata									
Potthastia cf. longimanus									
Procladius sp.									
Others									

APPENDIX 2. Continued.

	MONTH: October					DEPTH: 6 meters			
	Inner Region			Intermediate Region			Outer Region		
Taxa	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Chironomidae	9050	5014		3777	1803		3252	443	
Chironomus sp.									
Chironomus fluviatilis-gr.	20	13	0.2	40	20	1.1	263	88	8.1
Chironomus halophilus-gr.									
Cryptochironomus sp. 1									
Cryptochironomus sp. 2	71	29	0.8	30	21	0.8	141	26	4.3
Cryptochironomus sp. 3	20	20	0.2	40	13	1.1	51	33	1.6
Cryptochironomus cf. rolli	20	13	0.2	30	21	0.8	10	10	0.3
Parachironomus cf. abortivus									
Paracladopelma cf. nereis									
Paracladopelma cf. undine									
Paracladopelma camptolabis-gr.	404	81	4.5	293	145	7.8	2000	310	61.5
Paracladopelma cf. winnelli									
Robackia cf. demeijerei	354	249	3.9	141	78	3.7			
Saetheria cf. tylus	8151	4910	90.1	3141	1849	83.2	121	41	3.7
Polypedilum cf. scalaenum	10	10	0.1	20	13	0.5	263	91	8.1
Polypedilum fallax-gr.									
Polypedilum sp. 2									
Cladotanytarsus sp.				40	20	1.1	394	56	12.1
Micropsectra sp.									
Tanytarsus sp.									
Psectrocladius sp.									
Cricotopus sp.									
Heterotrissocladius cf. changi									
Hydrobaenus sp.									
Orthocladius (O.) sp. 1									
Orthocladius (O.) sp. 2									
Orthocladius (E.) sp.									
Parakiefferiella sp.									
Monodiamesa cf. tuberculata							10	10	0.3
Potthastia cf. longimanus									
Procladius sp.									
Others									

APPENDIX 2. Continued.

Taxa	Inner Region $\overline{X}$	Inner Region S.E.	Inner Region %	Intermediate Region $\overline{X}$	Intermediate Region S.E.	Intermediate Region %	Outer Region $\overline{X}$	Outer Region S.E.	Outer Region %
MONTH: October / DEPTH: 9 meters									
Total Chironomidae	2677	595		3777	323		4151	625	
Chironomus sp.									
Chironomus fluviatilis-gr.	131	48	4.9	182	35	4.8	192	69	4.6
Chironomus halophilus-gr.									
Cryptochironomus sp. 1									
Cryptochironomus sp. 2	222	34	8.3	455	99	12.0	323	84	7.8
Cryptochironomus sp. 3				20	13	0.5	30	14	0.7
Cryptochironomus cf. rolli							10	10	0.2
Parachironomus cf. abortivus									
Paracladopelma cf. nereis									
Paracladopelma cf. undine									
Paracladopelma camptolabis-gr.	1242	300	46.4	1535	200	40.6	1687	398	40.6
Paracladopelma cf. winnelli	10	10	0.4	10	10	0.3	10	10	0.2
Robackia cf. demeijerei									
Saetheria cf. tylus	333	60	12.5	222	67	5.9	232	104	5.6
Polypedilum cf. scalaenum	616	225	23.0	1101	128	29.1	1040	208	25.1
Polypedilum fallax-gr.									
Polypedilum sp. 2									
Cladotanytarsus sp.	81	30	3.0	202	43	5.3	545	126	13.1
Micropsectra sp.									
Tanytarsus sp.									
Psectrocladius sp.									
Cricotopus sp.									
Heterotrissocladius cf. changi				10	10	0.3	10	10	0.2
Hydrobaenus sp.	10	10	0.4						
Orthocladius (O.) sp. 1									
Orthocladius (O.) sp. 2									
Orthocladius (E.) sp.									
Parakiefferiella sp.	20	20	0.8	30	14	0.8	71	19	1.7
Monodiamesa cf. tuberculata	10	10	0.4	10	10	0.3			
Potthastia cf. longimanus									
Procladius sp.									
Others									

APPENDIX 2. Continued.

	MONTH: October					DEPTH: 12 meters			
	Inner Region			Intermediate Region			Outer Region		
Taxa	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%
Total Chironomidae	1990	264		1818	151		1586	272	
Chironomus sp.									
Chironomus fluviatilis-gr.	40	20	2.0	10	10	0.6	20	13	1.3
Chironomus halophilus-gr.									
Cryptochironomus sp. 1									
Cryptochironomus sp. 2	242	44	12.2	303	59	16.7	192	48	12.1
Cryptochironomus sp. 3									
Cryptochironomus cf. rolli									
Parachironomus cf. abortivus									
Paracladopelma cf. nereis									
Paracladopelma cf. undine	10	10	0.5						
Paracladopelma camptolabis-gr.	1040	201	52.3	758	71	41.7	717	133	45.2
Paracladopelma cf. winnelli									
Robackia cf. demeijerei									
Saetheria cf. tylus	232	74	11.7	162	20	8.9	283	95	17.8
Polypedilum cf. scalaenum	253	103	12.7	394	108	21.7	293	59	18.5
Polypedilum fallax-gr.									
Polypedilum sp. 2									
Cladotanytarsus sp.	40	30	2.0	71	19	3.9	40	20	2.5
Micropsectra sp.									
Tanytarsus sp.									
Psectrocladius sp.									
Cricotopus sp.									
Heterotrissocladius cf. changi	10	10	0.5	20	13	1.1			
Hydrobaenus sp.									
Orthocladius (O.) sp. 1									
Orthocladius (O.) sp. 2									
Orthocladius (E.) sp.									
Parakiefferiella sp.	81	34	4.1	30	14	1.7	20	13	1.3
Monodiamesa cf. tuberculata	30	14	1.5	10	10	0.6	10	10	0.6
Potthastia cf. longimanus	10	10	0.5	61	31	3.3	10	10	0.6
Procladius sp.									
Others									

APPENDIX 2. Continued.

MONTH: October DEPTH: 15 meters

Taxa	Inner Region $\bar{X}$	Inner Region S.E.	Inner Region %	Intermediate Region $\bar{X}$	Intermediate Region S.E.	Intermediate Region %	Outer Region $\bar{X}$	Outer Region S.E.	Outer Region %
Total Chironomidae	535	117		475	103		697	173	
Chironomus sp.									
Chironomus fluviatilis-gr.	10	10	1.9						
Chironomus halophilus-gr.									
Cryptochironomus sp. 1									
Cryptochironomus sp. 2	101	40	18.9	152	54	31.9	152	64	21.7
Cryptochironomus sp. 3									
Cryptochironomus cf. rolli									
Parachironomus cf. abortivus									
Paracladopelma cf. nereis									
Paracladopelma cf. undine									
Paracladopelma camptolabis-gr.	91	26	17.0	71	29	14.9	333	85	47.8
Paracladopelma cf. winnelli				10	10	2.1			
Robackia cf. demeijerei									
Saetheria cf. tylus	182	119	34.0	20	13	4.3	51	19	7.2
Polypedilum cf. scalaenum	71	29	13.2	30	21	6.4	71	19	10.1
Polypedilum fallax-gr.							10	10	1.4
Polypedilum sp. 2									
Cladotanytarsus sp.									
Micropsectra sp.									
Tanytarsus sp.									
Psectrocladius sp.									
Cricotopus sp.									
Heterotrissocladius cf. changi	10	10	1.9	101	43	21.3	51	29	7.2
Hydrobaenus sp.									
Orthocladius (O.) sp. 1									
Orthocladius (O.) sp. 2									
Orthocladius (E.) sp.									
Parakiefferiella sp.									
Monodiamesa cf. tuberculata	61	31	11.3	71	29	14.9	20	13	2.9
Potthastia cf. longimanus	10	10	1.9	20	20	4.3	10	10	1.4
Procladius sp.									
Others									

APPENDIX 3. Mean densities (number m^{-2}) of annelid taxa collected during April, July and October 1978 in the inner (treatment area near present thermal discharge), intermediate and outer (reference areas) regions at 3-15 m near the J. H. Campbell Plant, eastern Lake Michigan. In addition to mean and standard error, naidid and tubificid taxa in each region have been expressed as a percentage of total naidids and total tubificids, respectively. ($\bar{X}$ = mean, S.E. = standard error, n = 6).

MONTH: April DEPTH: 3 meters

Taxa	Inner Region $\bar{X}$	Inner Region S.E.	Inner Region %	Intermediate Region $\bar{X}$	Intermediate Region S.E.	Intermediate Region %	Outer Region $\bar{X}$	Outer Region S.E.	Outer Region %
Total Naididae	10	10							
Chaetogaster diaphanus									
Chaetogaster diastrophus									
Chaetogaster setosus									
Nais simplex	10	10	100						
Nais variabilis									
Paranais litoralis									
Paranais simplex									
Piguetiella michiganensis									
Pristina foreli									
Pristina osborni									
Stylaria lacustris									
Uncinais uncinata									
Vejdovskyella intermedia									
Amphichaeta leydigii									
Dero sp.									
Total Tubificidae				10	10				
Limnodrilus hoffmeisteri									
Limnodrilus angustipenis									
Limnodrilus profundicola									
Limnodrilus spiralis									
Limnodrilus udekemianus									
Aulodrilus limnobius									
Peloscolex freyi									
Potamothrix moldaviensis									
Potamothrix vejdovskyi									
Immatures w/o hair chaetae				10	10	100			
Immatures w/hair chaetae									
Stylodrilus heringianus									
Enchytraeidae									
Hirudinea									

APPENDIX 3. Continued.

Taxa	Inner Region $\bar{X}$	Inner Region S.E.	Inner Region %	Intermediate Region $\bar{X}$	Intermediate Region S.E.	Intermediate Region %	Outer Region $\bar{X}$	Outer Region S.E.	Outer Region %
MONTH: April DEPTH: 6 meters									
Total Naididae				10	10				
Chaetogaster diaphanus									
Chaetogaster diastrophus									
Chaetogaster setosus									
Nais simplex									
Nais variabilis									
Paranais litoralis									
Paranais simplex									
Piguetiella michiganensis				10	10	100			
Pristina foreli									
Pristina osborni									
Stylaria lacustris									
Uncinais uncinata									
Vejdovskyella intermedia									
Amphichaeta leydigii									
Dero sp.									
Total Tubificidae							61	27	
Limnodrilus hoffmeisteri									
Limnodrilus angustipenis									
Limnodrilus profundicola									
Limnodrilus spiralis									
Limnodrilus udekemianus									
Aulodrilus limnobius									
Peloscolex freyi									
Potamothrix moldaviensis									
Potamothrix vejdovskyi							10	10	16.7
Immatures w/o hair chaetae							51	24	83.3
Immatures w/hair chaetae									
Stylodrilus heringianus									
Enchytraeidae									
Hirudinea									

APPENDIX 3. Continued.

Taxa	Inner Region $\overline{X}$	Inner Region S.E.	Inner Region %	Intermediate Region $\overline{X}$	Intermediate Region S.E.	Intermediate Region %	Outer Region $\overline{X}$	Outer Region S.E.	Outer Region %
	MONTH: April					DEPTH: 9 meters			
Total Naididae	303	103		273	111		192	40	
Chaetogaster diaphanus									
Chaetogaster diastrophus									
Chaetogaster setosus									
Nais simplex									
Nais variabilis									
Paranais litoralis									
Paranais simplex									
Piguetiella michiganensis	293	104	96.7	263	116	96.3	192	40	100
Pristina foreli									
Pristina osborni									
Stylaria lacustris									
Uncinais uncinata	10	10	3.3	10	10	3.7			
Vejdovskyella intermedia									
Amphichaeta leydigii									
Dero sp.									
Total Tubificidae	1111	543		929	304		1626	373	
Limnodrilus hoffmeisteri	20	20	1.8				20	13	1.2
Limnodrilus angustipenis	10	10	0.9	10	10	1.1	20	13	1.2
Limnodrilus profundicola	10	10	0.9						
Limnodrilus spiralis				10	10	1.1	20	13	1.2
Limnodrilus udekemianus									
Aulodrilus limnobius									
Peloscolex freyi									
Potamothrix moldaviensis	40	20	3.6	30	13	3.3	91	41	5.6
Potamothrix vejdovskyi									
Immatures w/o hair chaetae	1030	511	92.7	879	292	94.6	1475	366	90.7
Immatures w/hair chaetae									
Stylodrilus heringianus									
Enchytraeidae									
Hirudinea									

APPENDIX 3. Continued.

Taxa	Inner Region $\overline{X}$	Inner Region S.E.	Inner Region %	Intermediate Region $\overline{X}$	Intermediate Region S.E.	Intermediate Region %	Outer Region $\overline{X}$	Outer Region S.E.	Outer Region %
	MONTH: April					DEPTH:12 meters			
Total Naididae	313	130		283	66		1192	442	
Chaetogaster diaphanus									
Chaetogaster diastrophus									
Chaetogaster setosus									
Nais simplex									
Nais variabilis									
Paranais litoralis							444	444	37.3
Paranais simplex									
Piguetiella michiganensis	293	117	93.5	283	66	100	727	192	61.0
Pristina foreli									
Pristina osborni									
Stylaria lacustris									
Uncinais uncinata	20	20	6.5				20	13	1.7
Vejdovskyella intermedia									
Amphichaeta leydigii									
Dero sp.									
Total Tubificidae	697	450		1737	433		1303	343	
Limnodrilus hoffmeisteri									
Limnodrilus angustipenis				10	10	0.6	20	13	1.6
Limnodrilus profundicola									
Limnodrilus spiralis	10	10	1.4	40	40	2.3	51	29	3.9
Limnodrilus udekemianus									
Aulodrilus limnobius									
Peloscolex freyi									
Potamothrix moldaviensis	20	20	2.9	131	57	7.6	61	61	4.7
Potamothrix vejdovskyi									
Immatures w/o hair chaetae	667	431	95.7	1555	368	89.5	1172	307	89.9
Immatures w/hair chaetae									
Stylodrilus heringianus									
Enchytraeidae				30	21		10	10	
Hirudinea									

APPENDIX 3. Continued.

Taxa	MONTH: April					DEPTH: 15 meters			
	Inner Region			Intermediate Region			Outer Region		
	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Naididae	273	108		444	125		263	120	
Chaetogaster diaphanus									
Chaetogaster diastrophus									
Chaetogaster setosus									
Nais simplex									
Nais variabilis							10	10	3.8
Paranais litoralis									
Paranais simplex									
Piguetiella michiganensis	263	102	96.3	444	125	100	242	111	92.3
Pristina foreli									
Pristina osborni									
Stylaria lacustris									
Uncinais uncinata	10	10	3.7				10	10	3.8
Vejdovskyella intermedia									
Amphichaeta leydigii									
Dero sp.									
Total Tubificidae	1737	525		1545	488		1606	694	
Limnodrilus hoffmeisteri	30	21	1.7						
Limnodrilus angustipenis				20	20	1.3	20	20	1.3
Limnodrilus profundicola									
Limnodrilus spiralis	51	29	2.9	20	13	1.3	20	13	1.3
Limnodrilus udekemianus									
Aulodrilus limnobius									
Peloscolex freyi									
Potamothrix moldaviensis	91	38	5.2	71	24	4.6	81	43	5.0
Potamothrix vejdovskyi	10	10	0.6	30	21	2.0	51	33	3.1
Immatures w/o hair chaetae	1545	480	89.0	1404	446	90.8	1343	639	83.6
Immatures w/hair chaetae	10	10	0.6				91	91	5.7
Stylodrilus heringianus									
Enchytraeidae				20	20				
Hirudinea	20	13		20	13		20	13	

APPENDIX 3. Continued.

MONTH: July DEPTH: 3 meters

Taxa	Inner Region			Intermediate Region			Outer Region		
	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Naididae	475	179							
Chaetogaster diaphanus	40	26	8.5						
Chaetogaster diastrophus									
Chaetogaster setosus									
Nais simplex									
Nais variabilis	51	33	10.6						
Paranais litoralis									
Paranais simplex									
Piguetiella michiganensis	30	21	6.4						
Pristina foreli									
Pristina osborni									
Stylaria lacustris	20	20	4.3						
Uncinais uncinata	333	128	70.2						
Vejdovskyella intermedia									
Amphichaeta leydigii									
Dero sp.									
Total Tubificidae				10	10				
Limnodrilus hoffmeisteri									
Limnodrilus angustipenis									
Limnodrilus profundicola									
Limnodrilus spiralis									
Limnodrilus udekemianus									
Aulodrilus limnobius									
Peloscolex freyi									
Potamothrix moldaviensis									
Potamothrix vejdovskyi									
Immatures w/o hair chaetae				10	10	100			
Immatures w/hair chaetae									
Stylodrilus heringianus									
Enchytraeidae									
Hirudinea									

APPENDIX 3. Continued.

MONTH: July DEPTH: 6 meters

Taxa	Inner Region $\bar{X}$	Inner S.E.	Inner %	Intermediate Region $\bar{X}$	Intermediate S.E.	Intermediate %	Outer Region $\bar{X}$	Outer S.E.	Outer %
Total Naididae	1848	457		1202	269		1667	335	
Chaetogaster diaphanus	677	290	36.6	232	105	19.3	667	173	40.0
Chaetogaster diastrophus									
Chaetogaster setosus									
Nais simplex									
Nais variabilis	71	29	3.8	40	20	3.4	20	13	1.2
Paranais litoralis							20	13	1.2
Paranais simplex							10	10	0.6
Piguetiella michiganensis	91	34	4.9	101	34	8.4	131	53	7.9
Pristina foreli									
Pristina osborni									
Stylaria lacustris	91	38	4.9	81	53	6.7	81	40	4.8
Uncinais uncinata	909	155	49.2	747	173	62.2	737	137	44.2
Vejdovskyella intermedia	10	10	0.5						
Amphichaeta leydigii									
Dero sp.									
Total Tubificidae	20	20		152	99		687	322	
Limnodrilus hoffmeisteri									
Limnodrilus angustipenis				10	10	6.7	10	10	1.5
Limnodrilus profundicola				20	20	13.3			
Limnodrilus spiralis									
Limnodrilus udekemianus									
Aulodrilus limnobius									
Peloscolex freyi							40	26	5.9
Potamothrix moldaviensis	10	10	50.0						
Potamothrix vejdovskyi									
Immatures w/o hair chaetae	10	10	50.0	121	77	80.0	636	201	92.6
Immatures w/hair chaetae									
Stylodrilus heringianus									
Enchytraeidae									
Hirudinea									

APPENDIX 3. Continued.

	MONTH: July					DEPTH: 9 meters			
	Inner Region			Intermediate Region			Outer Region		
Taxa	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Naididae	2717	588		3959	933		4101	436	
Chaetogaster diaphanus	626	241	23.0	1879	587	47.4	1626	341	39.7
Chaetogaster diastrophus									
Chaetogaster setosus									
Nais simplex									
Nais variabilis	20	13	0.7	10	10	0.3	30	21	0.7
Paranais litoralis				10	10	0.3			
Paranais simplex	51	29	1.9	20	20	0.5			
Piguetiella michiganensis	768	204	28.3	657	143	16.6	970	297	23.6
Pristina foreli									
Pristina osborni									
Stylaria lacustris	455	190	16.7	677	212	17.1	838	245	20.4
Uncinais uncinata	677	193	24.9	495	65	12.5	576	186	14.0
Vejdovskyella intermedia	71	29	2.6	212	100	5.4	61	27	1.5
Amphichaeta leydigii	51	51	1.9						
Dero sp.									
Total Tubificidae	1667	344		1626	370		1222	398	
Limnodrilus hoffmeisteri	20	20	1.2	40	26	2.5			
Limnodrilus angustipenis	40	13	2.4	40	13	2.5	10	10	0.8
Limnodrilus profundicola				10	10	0.6			
Limnodrilus spiralis									
Limnodrilus udekemianus									
Aulodrilus limnobius									
Peloscolex freyi	10	10	0.6	40	30	2.5	61	22	5.0
Potamothrix moldaviensis	131	33	7.9	253	65	15.5	182	115	14.9
Potamothrix vejdovskyi									
Immatures w/o hair chaetae	1465	332	87.9	1242	302	76.4	970	316	79.3
Immatures w/hair chaetae									
Stylodrilus heringianus	61	50					10	10	
Enchytraeidae									
Hirudinea									

APPENDIX 3. Continued.

	MONTH: July					DEPTH: 12 meters			
	Inner Region			Intermediate Region			Outer Region		
Taxa	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Naididae	2818	703		4111	927		5252	1459	
Chaetogaster diaphanus	475	126	16.8	879	275	21.4	1515	458	28.8
Chaetogaster diastrophus									
Chaetogaster setosus									
Nais simplex									
Nais variabilis	20	13	0.7	10	10	0.2			
Paranais litoralis	10	10	0.4						
Paranais simplex	20	20	0.7	51	19	1.2	51	19	1.0
Piguetiella michiganensis	697	144	24.7	1091	278	26.5	1333	330	25.4
Pristina foreli									
Pristina osborni									
Stylaria lacustris	1333	515	47.3	1798	446	43.7	2010	844	38.3
Uncinais uncinata	91	38	3.2	131	36	3.2	212	66	4.0
Vejdovskyella intermedia	172	71	6.1	152	44	3.7	131	59	2.5
Amphichaeta leydigii									
Dero sp.									
Total Tubificidae	424	197		1252	258		1222	536	
Limnodrilus hoffmeisteri	121	86	28.6	61	16	4.8	81	34	6.6
Limnodrilus angustipenis				61	16	4.8	51	40	4.1
Limnodrilus profundicola	10	10	2.4	51	24	4.0	40	26	3.3
Limnodrilus spiralis				10	10	0.8			
Limnodrilus udekemianus									
Aulodrilus limnobius									
Peloscolex freyi	10	10	2.4	30	21	2.4	30	21	2.5
Potamothrix moldaviensis	61	49	14.3	71	36	5.6	141	74	11.6
Potamothrix vejdovskyi									
Immatures w/o hair chaetae	222	87	52.4	970	234	77.4	879	405	71.9
Immatures w/hair chaetae									
Stylodrilus heringianus				10	10		121	98	
Enchytraeidae									
Hirudinea									

APPENDIX 3. Continued.

	MONTH: July					DEPTH: 15 meters			
	Inner Region			Intermediate Region			Outer Region		
Taxa	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Naididae	646	177		1545	503		737	86	
Chaetogaster diaphanus	61	38	9.4	172	61	11.1	31	30	11.0
Chaetogaster diastrophus									
Chaetogaster setosus									
Nais simplex									
Nais variabilis				40	13	2.6	10	10	1.4
Paranais litoralis	10	10	1.6	10	10	0.7	10	10	1.4
Paranais simplex	131	131	20.3						
Piguetiella michiganensis	222	51	34.4	444	315	28.8	343	81	46.6
Pristina foreli									
Pristina osborni									
Stylaria lacustris	131	61	20.3	505	180	32.7	91	58	12.3
Uncinais uncinata	40	20	6.3	222	74	14.4	152	71	20.5
Vejdovskyella intermedia	51	29	7.8	152	87	9.8	51	24	6.8
Amphichaeta leydigii									
Dero sp.									
Total Tubificidae	242	88		1101	923		788	397	
Limnodrilus hoffmeisteri	10	10	4.2	61	61	5.5	61	49	7.7
Limnodrilus angustipenis	10	10	4.2						
Limnodrilus profundicola				10	10	0.9			
Limnodrilus spiralis									
Limnodrilus udekemianus									
Aulodrilus limnobius									
Peloscolex freyi									
Potamothrix moldaviensis	10	10	4.2	101	71	9.2	81	78	10.3
Potamothrix vejdovskyi	10	10	4.2	91	91	8.3	30	21	3.8
Immatures w/o hair chaetae	202	81	83.3	747	653	67.9	606	295	76.9
Immatures w/hair chaetae				91	91	8.3	10	10	1.3
Stylodrilus heringianus	61	27		879	479		1293	781	
Enchytraeidae									
Hirudinea	10	10		10	10		71	40	

APPENDIX 3. Continued.

	MONTH: October					DEPTH: 3 meters			
	Inner Region			Intermediate Region			Outer Region		
Taxa	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Naididae							30	13	
Chaetogaster diaphanus									
Chaetogaster diastrophus							10	10	33.3
Chaetogaster setosus									
Nais simplex									
Nais variabilis									
Paranais litoralis									
Paranais simplex									
Piguetiella michiganensis							10	10	33.3
Pristina foreli									
Pristina osborni									
Stylaria lacustris									
Uncinais uncinata									
Vejdovskyella intermedia									
Amphichaeta leydigii							10	10	33.3
Dero sp.									
Total Tubificidae									
Limnodrilus hoffmeisteri									
Limnodrilus angustipenis									
Limnodrilus profundicola									
Limnodrilus spiralis									
Limnodrilus udekemianus									
Aulodrilus limnobius									
Peloscolex freyi									
Potamothrix moldaviensis									
Potamothrix vejdovskyi									
Immatures w/o hair chaetae									
Immatures w/hair chaetae									
Stylodrilus heringianus									
Enchytraeidae									
Hirudinea									

APPENDIX 3. Continued.

	MONTH: October					DEPTH: 6 meters			
	Inner Region			Intermediate Region			Outer Region		
Taxa	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%
Total Naididae	91	38		232	123		1151	460	
Chaetogaster diaphanus									
Chaetogaster diastrophus							101	68	8.8
Chaetogaster setosus									
Nais simplex									
Nais variabilis									
Paranais litoralis									
Paranais simplex									
Piguetiella michiganensis	71	40	77.8	152	78	65.2	909	319	78.9
Pristina foreli	10	10	11.1	30	21	13.0			
Pristina osborni				30	30	13.0			
Stylaria lacustris									
Uncinais uncinata	10	10	11.1	20	20	8.7	111	57	9.6
Vejdovskyella intermedia									
Amphichaeta leydigii							30	30	2.6
Dero sp.									
Total Tubificidae	30	21		51	40		242	111	
Limnodrilus hoffmeisteri									
Limnodrilus angustipenis									
Limnodrilus profundicola									
Limnodrilus spiralis									
Limnodrilus udekemianus									
Aulodrilus limnobius									
Peloscolex freyi									
Potamothrix moldaviensis									
Potamothrix vejdovskyi									
Immatures w/o hair chaetae	30	21	100	51	40	100	242	111	100
Immatures w/hair chaetae									
Stylodrilus heringianus									
Enchytraeidae									
Hirudinea									

APPENDIX 3. Continued.

	MONTH: October					DEPTH: 9 meters			
	Inner Region			Intermediate Region			Outer Region		
Taxa	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Naididae	2030	281		1848	131		2586	393	
Chaetogaster diaphanus									
Chaetogaster diastrophus							51	33	2.0
Chaetogaster setosus									
Nais simplex									
Nais variabilis									
Paranais litoralis									
Paranais simplex									
Piguetiella michiganensis	1939	262	95.5	1798	134	97.3	2293	362	88.7
Pristina foreli									
Pristina osborni							10	10	0.4
Stylaria lacustris									
Uncinais uncinata	91	21	4.5	51	19	2.7	162	37	6.3
Vejdovskyella intermedia							20	20	0.8
Amphichaeta leydigii							51	40	2.0
Dero sp.									
Total Tubificidae	1263	275		1232	242		1586	214	
Limnodrilus hoffmeisteri									
Limnodrilus angustipenis									
Limnodrilus profundicola									
Limnodrilus spiralis									
Limnodrilus udekemianus									
Aulodrilus limnobius									
Peloscolex freyi									
Potamothrix moldaviensis							30	21	1.9
Potamothrix vejdovskyi									
Immatures w/o hair chaetae	1263	275	100	1232	242	100	1555	209	98.1
Immatures w/hair chaetae									
Stylodrilus heringianus	20	13					10	10	
Enchytraeidae	10	10					141	53	
Hirudinea									

APPENDIX 3. Continued.

Taxa	Inner Region $\overline{X}$	Inner Region S.E.	Inner Region %	Intermediate Region $\overline{X}$	Intermediate Region S.E.	Intermediate Region %	Outer Region $\overline{X}$	Outer Region S.E.	Outer Region %
	MONTH: October					DEPTH:12 meters			
Total Naididae	1242	213		899	207		1677	405	
Chaetogaster diaphanus									
Chaetogaster diastrophus									
Chaetogaster setosus							20	13	1.2
Nais simplex									
Nais variabilis									
Paranais litoralis									
Paranais simplex	40	13	3.3						
Piguetiella michiganensis	1141	211	91.9	859	208	95.5	1626	384	97.0
Pristina foreli				10	10	1.1			
Pristina osborni									
Stylaria lacustris									
Uncinais uncinata	10	10	0.8	10	10	1.1	20	13	1.2
Vejdovskyella intermedia	51	50	4.1	20	13	2.2			
Amphichaeta leydigii							10	10	0.6
Dero sp.									
Total Tubificidae	2040	546		1838	641		2515	501	
Limnodrilus hoffmeisteri									
Limnodrilus angustipenis									
Limnodrilus profundicola									
Limnodrilus spiralis									
Limnodrilus udekemianus									
Aulodrilus limnobius									
Peloscolex freyi									
Potamothrix moldaviensis									
Potamothrix vejdovskyi	20	13	1.0						
Immatures w/o hair chaetae	2010	539	98.5	1838	641	100	2515	501	100
Immatures w/hair chaetae	10	10	0.5						
Stylodrilus heringianus	10	10					10	10	
Enchytraeidae	434	150		61	61		222	79	
Hirudinea									

APPENDIX 3. Continued.

	MONTH: October					DEPTH: 15meters			
	Inner Region			Intermediate Region			Outer Region		
Taxa	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Naididae	949	161		1151	287		1465	216	
Chaetogaster diaphanus	20	13	2.1				20	13	1.4
Chaetogaster diastrophus							10	10	0.7
Chaetogaster setosus									
Nais simplex									
Nais variabilis	10	10	1.1				10	10	0.7
Paranais litoralis									
Paranais simplex									
Piguetiella michiganensis	717	146	75.5	727	279	63.2	1323	199	90.3
Pristina foreli	10	10	1.1				10	10	0.7
Pristina osborni									
Stylaria lacustris									
Uncinais uncinata				303	291	26.3			
Vejdovskyella intermedia	172	93	18.1	91	44	7.9	81	37	5.5
Amphichaeta leydigii	10	10	1.1				10	10	0.7
Dero sp.	10	10	1.1	30	21	2.6			
Total Tubificidae	1959	867		2707	1202		1707	67	
Limnodrilus hoffmeisteri									
Limnodrilus angustipenis									
Limnodrilus profundicola									
Limnodrilus spiralis									
Limnodrilus udekemianus							10	10	0.6
Aulodrilus limnobius							10	10	0.6
Peloscolex freyi									
Potamothrix moldaviensis	51	33	2.6	61	31	2.2			
Potamothrix vejdovskyi	40	26	2.1	162	87	6.0	131	83	7.7
Immatures w/o hair chaetae	1869	830	95.4	2404	1106	88.8	1535	606	89.9
Immatures w/hair chaetae				81	37	3.0	20	13	1.2
Stylodrilus heringianus	1020	498		2354	1456		1091	494	
Enchytraeidae	434	193		677	322		778	340	
Hirudinea							10	10	

APPENDIX 4. Mean densities (number m^{-2}) of gastropod and pelecypod taxa collected during April, July and October 1978 in the inner (treatment area near present thermal discharge), intermediate and outer (reference areas) regions at 3-15 m near the J. H. Campbell Plant, eastern Lake Michigan. In addition to mean and standard error, the taxa beneath total Gastropoda, total *Pisidium* and total *Sphaerium* in each region have been expressed as a percentage of their respective summed totals. ($\overline{X}$ = mean, S.E. = standard error, n = 6).

MONTH: April DEPTH: 3 meters

Taxa	Inner Region			Intermediate Region			Outer Region		
	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Gastropoda									
Valvata sincera									
Valvata sp.									
Amnicola sp.									
Bythinia tentaculata									
Lymnaea sp.									
Total Pelecypoda									
Total *Pisidium*									
Pisidium adamsi									
Pisidium casertanum									
Pisidium compressum									
Pisidium conventus									
Pisidium fallax									
Pisidium henslowanum									
Pisidium lilljeborgi									
Pisidium nitidum f. *nitidum*									
Pisidium nitidum f. *pauperculum*									
Pisidium supinum									
Pisidium variabile									
Pisidium walkeri									
Pisidium spp.									
Total *Sphaerium*									
Sphaerium nitidum									
Sphaerium striatinum									
Sphaerium transversum									

APPENDIX 4. Continued.

	MONTH: April				DEPTH: 6 meters				
	Inner Region			Intermediate Region			Outer Region		
Taxa	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%
Total Gastropoda									
Valvata sincera									
Valvata sp.									
Amnicola sp.									
Bythinia tentaculata									
Lymnaea sp.									
Total Pelecypoda				10	10				
Total *Pisidium*				10	10				
Pisidium adamsi									
Pisidium casertanum									
Pisidium compressum									
Pisidium conventus									
Pisidium fallax									
Pisidium henslowanum									
Pisidium lilljeborgi									
Pisidium nitidum f. *nitidum*									
Pisidium nitidum f. *pauperculum*									
Pisidium supinum									
Pisidium variabile									
Pisidium walkeri									
Pisidium spp.				10	10	100			
Total *Sphaerium*									
Sphaerium nitidum									
Sphaerium striatinum									
Sphaerium transversum									

APPENDIX 4. Continued.

	MONTH: April					DEPTH: 9 meters			
	Inner Region			Intermediate Region			Outer Region		
Taxa	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Gastropoda	40	20					20	13	
Valvata sincera									
Valvata sp.	40	20	100				20	13	100
Amnicola sp.									
Bythinia tentaculata									
Lymnaea sp.									
Total Pelecypoda	131	65		121	50		121	35	
Total Pisidium	131	65		111	43		121	35	
Pisidium adamsi									
Pisidium casertanum	51	40	38.5	30	21	27.0	40	20	33.3
Pisidium compressum									
Pisidium conventus				10	10	9.0	30	30	25.0
Pisidium fallax									
Pisidium henslowanum							10	10	8.3
Pisidium lilljeborgi									
Pisidium nitidum f. nitidum	40	20	30.8	71	30	64.0	20	13	16.7
Pisidium nitidum f. pauperculum	10	10	7.7						
Pisidium supinum									
Pisidium variabile									
Pisidium walkeri									
Pisidium spp.	30	30	23.1				20	13	16.7
Total Sphaerium				10	10				
Sphaerium nitidum									
Sphaerium striatinum				10	10	100			
Sphaerium transversum									

APPENDIX 4. Continued.

Taxa	MONTH: April			DEPTH: 12 meters					
	Inner Region			Intermediate Region			Outer Region		
	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Gastropoda	51	29		81	20		202	49	
Valvata sincera									
Valvata sp.	51	29	100	61	22	75.0	141	37	70.0
Amnicola sp.				10	10	12.5	51	33	25.0
Bythinia tentaculata									
Lymnaea sp.				10	10	12.5	10	10	5.0
Total Pelecypoda	222	116		283	84		374	48	
Total *Pisidium*	222	116		273	88		374	48	
Pisidium adamsi									
Pisidium casertanum	20	20	9.1	121	44	44.4	162	40	43.3
Pisidium compressum									
Pisidium conventus	20	13	9.1	30	21	11.1	20	13	5.4
Pisidium fallax	30	14	13.6	20	13	7.4	20	13	5.4
Pisidium henslowanum	10	10	4.5	10	10	3.7			
Pisidium lilljeborgi									
Pisidium nitidum f. *nitidum*	121	83	54.6	71	36	25.9	131	48	35.1
Pisidium nitidum f. *pauperculum*									
Pisidium supinum									
Pisidium variabile	10	10	4.5	10	10	3.7			
Pisidium walkeri									
Pisidium spp.	10	10	4.5	10	10	3.7	40	20	10.8
Total *Sphaerium*				10	10				
Sphaerium nitidum									
Sphaerium striatinum				10	10	100			
Sphaerium transversum									

APPENDIX 4. Continued.

MONTH: April DEPTH: 15 meters

Taxa	Inner Region $\overline{X}$	Inner Region S.E.	Inner Region %	Intermediate Region $\overline{X}$	Intermediate Region S.E.	Intermediate Region %	Outer Region $\overline{X}$	Outer Region S.E.	Outer Region %
Total Gastropoda	131	63		81	40		141	73	
Valvata sincera									
Valvata sp.	91	58	69.2	61	27	75.0	91	44	64.3
Amnicola sp.	40	13	30.8	20	20	25.0	40	26	28.6
Bythinia tentaculata									
Lymnaea sp.							10	10	7.1
Total Pelecypoda	818	84		556	241		687	323	
Total Pisidium	818	84		556	241		646	309	
Pisidium adamsi									
Pisidium casertanum	152	46	18.6	172	85	30.9	283	141	43.8
Pisidium compressum									
Pisidium conventus	101	13	12.3	61	38	10.9	61	31	9.4
Pisidium fallax	71	19	8.7	20	13	3.6	71	33	10.9
Pisidium henslowanum	20	13	2.4	20	20	3.6			
Pisidium lilljeborgi									
Pisidium nitidum f. nitidum	354	61	43.3	152	76	27.3	202	105	31.3
Pisidium nitidum f. pauperculum									
Pisidium supinum									
Pisidium variabile	40	30	4.9	10	10	1.8			
Pisidium walkeri									
Pisidium spp.	81	20	9.9	121	41	21.8	30	14	4.7
Total Sphaerium							40	30	
Sphaerium nitidum									
Sphaerium striatinum							40	30	100
Sphaerium transversum									

APPENDIX 4. Continued.

	MONTH: July					DEPTH: 3 meters			
	Inner Region			Intermediate Region			Outer Region		
Taxa	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Gastropoda									
Valvata sincera									
Valvata sp.									
Amnicola sp.									
Bythinia tentaculata									
Lymnaea sp.									
Total Pelecypoda									
Total *Pisidium*									
Pisidium adamsi									
Pisidium casertanum									
Pisidium compressum									
Pisidium conventus									
Pisidium fallax									
Pisidium henslowanum									
Pisidium lilljeborgi									
Pisidium nitidum f. *nitidum*									
Pisidium nitidum f. *pauperculum*									
Pisidium supinum									
Pisidium variabile									
Pisidium walkeri									
Pisidium spp.									
Total *Sphaerium*									
Sphaerium nitidum									
Sphaerium striatinum									
Sphaerium transversum									

APPENDIX 4. Continued.

	MONTH: July					DEPTH: 6 meters		
	Inner Region			Intermediate Region			Outer Region		
Taxa	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Gastropoda				20	20		10	10	
Valvata sincera				10	10	50.0			
Valvata sp.									
Amnicola sp.				10	10	50.0	10	10	100
Bythinia tentaculata									
Lymnaea sp.									
Total Pelecypoda	20	13		30	21		51	24	
Total *Pisidium*	20	13		30	21		51	24	
Pisidium adamsi									
Pisidium casertanum	10	10	50.0	20	20	66.7	20	13	40.0
Pisidium compressum									
Pisidium conventus									
Pisidium fallax									
Pisidium henslowanum									
Pisidium lilljeborgi									
Pisidium nitidum f. *nitidum*							10	10	20.0
Pisidium nitidum f. *pauperculum*									
Pisidium supinum	10	10	50.0						
Pisidium variabile									
Pisidium walkeri									
Pisidium spp.				10	20	33.3	20	13	40.0
Total *Sphaerium*									
Sphaerium nitidum									
Sphaerium striatinum									
Sphaerium transversum									

APPENDIX 4. Continued.

	MONTH: July						DEPTH: 9 meters		
	Inner Region			Intermediate Region			Outer Region		
Taxa	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Gastropoda	40	20		30	21		51	19	
Valvata sincera	10	10	25.0				30	14	60.0
Valvata sp.	10	10	25.0	20	20	66.7	10	10	20.0
Amnicola sp.				10	10	33.3	10	10	20.0
Bythinia tentaculata									
Lymnaea sp.	20	20	50.0						
Total Pelecypoda	91	14		182	52		212	44	
Total Pisidium	81	13		182	52		212	44	
Pisidium adamsi									
Pisidium casertanum	30	14	37.5	81	37	44.5	111	55	52.4
Pisidium compressum	30	21	37.5	10	10	5.5			
Pisidium conventus									
Pisidium fallax				40	30	22.2	40	20	19.0
Pisidium henslowanum									
Pisidium lilljeborgi									
Pisidium nitidum f. nitidum	10	10	12.5	10	10	5.5			
Pisidium nitidum f. pauperculum							10	10	4.8
Pisidium supinum									
Pisidium variabile				20	13	11.0	20	20	9.5
Pisidium walkeri									
Pisidium spp.	10	10	12.5	20	13	11.0	30	21	14.3
Total Sphaerium	10	10							
Sphaerium nitidum									
Sphaerium striatinum	10	10	100						
Sphaerium transversum									

APPENDIX 4. Continued.

	MONTH: July					DEPTH: 12 meters		
	Inner Region			Intermediate Region			Outer Region		
Taxa	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Gastropoda	121	63		141	43		162	79	
Valvata sincera	71	48	58.3	81	26	57.1	131	77	81.3
Valvata sp.									
Amnicola sp.	51	29	41.7	51	19	35.7	30	21	18.8
Bythinia tentaculata									
Lymnaea sp.				10	10	7.1			
Total Pelecypoda	212	75		475	48		303	116	
Total Pisidium	212	75		465	51		273	100	
Pisidium adamsi									
Pisidium casertanum	71	40	33.3	182	52	39.1	91	34	33.3
Pisidium compressum							61	61	22.2
Pisidium conventus				10	10	2.2	10	10	3.7
Pisidium fallax	20	13	9.5	91	30	19.6	30	14	11.1
Pisidium henslowanum	30	21	14.3	20	13	4.3	10	10	3.7
Pisidium lilljeborgi									
Pisidium nitidum f. nitidum	10	10	4.8	40	20	8.7	20	13	7.4
Pisidium nitidum f. pauperculum	10	10	4.8	51	24	10.9	10	10	3.7
Pisidium supinum				10	10	2.2			
Pisidium variabile	20	20	9.5	20	13	4.3	30	14	11.1
Pisidium walkeri	30	30	14.3						
Pisidium spp.	20	13	9.5	40	40	8.7	10	10	3.7
Total Sphaerium				10	10		30	21	
Sphaerium nitidum									
Sphaerium striatinum							30	21	100
Sphaerium transversum				10	10	100			

APPENDIX 4. Continued.

MONTH: July DEPTH: 15 meters

Taxa	Inner Region			Intermediate Region			Outer Region		
	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Gastropoda	232	79		303	123		364	165	
Valvata sincera	51	29	21.7	242	88	80.0	232	103	63.9
Valvata sp.	91	51	39.1						
Amnicola sp.	91	41	39.1	61	38	20.0	131	67	36.1
Bythinia tentaculata									
Lymnaea sp.									
Total Pelecypoda	535	193		1404	804		1707	856	
Total *Pisidium*	535	193		1404	804		1667	826	
Pisidium adamsi									
Pisidium casertanum	81	43	15.1	232	186	16.5	253	119	15.2
Pisidium compressum	30	30	5.7	20	20	1.4	10	10	0.6
Pisidium conventus				30	30	2.2	152	73	9.1
Pisidium fallax	121	61	22.6	212	102	15.1	172	83	10.3
Pisidium henslowanum	51	24	9.4	172	93	12.2	172	104	10.3
Pisidium lilljeborgi				30	30	2.2			
Pisidium nitidum f. *nitidum*	91	38	17.0	414	235	29.5	586	323	35.2
Pisidium nitidum f. *pauperculum*	20	20	3.8	40	26	2.9			
Pisidium supinum				10	10	0.7			
Pisidium variabile	81	37	15.1	101	49	7.2	182	91	10.9
Pisidium walkeri									
Pisidium spp.	61	31	11.3	141	84	10.1	141	71	8.5
Total *Sphaerium*							40	40	
Sphaerium nitidum							20	20	50.0
Sphaerium striatinum							20	20	50.0
Sphaerium transversum									

APPENDIX 4. Continued.

	MONTH: October					DEPTH: 3 meters			
	Inner Region			Intermediate Region			Outer Region		
Taxa	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%
Total Gastropoda									
Valvata sincera									
Valvata sp.									
Amnicola sp.									
Bythinia tentaculata									
Lymnaea sp.									
Total Pelecypoda									
Total *Pisidium*									
Pisidium adamsi									
Pisidium casertanum									
Pisidium compressum									
Pisidium conventus									
Pisidium fallax									
Pisidium henslowanum									
Pisidium lilljeborgi									
Pisidium nitidum f. *nitidum*									
Pisidium nitidum f. *pauperculum*									
Pisidium supinum									
Pisidium variabile									
Pisidium walkeri									
Pisidium spp.									
Total *Sphaerium*									
Sphaerium nitidum									
Sphaerium striatinum									
Sphaerium transversum									

APPENDIX 4. Continued.

	MONTH: October					DEPTH: 6 meters			
	Inner Region			Intermediate Region			Outer Region		
Taxa	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%
Total Gastropoda									
Valvata sincera									
Valvata sp.									
Amnicola sp.									
Bythinia tentaculata									
Lymnaea sp.									
Total Pelecypoda									
Total *Pisidium*									
Pisidium adamsi									
Pisidium casertanum									
Pisidium compressum									
Pisidium conventus									
Pisidium fallax									
Pisidium henslowanum									
Pisidium lilljeborgi									
Pisidium nitidum f. *nitidum*									
Pisidium nitidum f. *pauperculum*									
Pisidium supinum									
Pisidium variabile									
Pisidium walkeri									
Pisidium spp.									
Total *Sphaerium*									
Sphaerium nitidum									
Sphaerium striatinum									
Sphaerium transversum									

APPENDIX 4. Continued.

	MONTH: October					DEPTH: 9 meters			
	Inner Region			Intermediate Region			Outer Region		
Taxa	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Gastropoda	40	30							
Valvata sincera	20	20	50.0						
Valvata sp.									
Amnicola sp.									
Bythinia tentaculata									
Lymnaea sp.	20	13	50.0						
Total Pelecypoda	192	43		192	83		141	60	
Total Pisidium	192	43		162	69		121	65	
Pisidium adamsi									
Pisidium casertanum	10	10	5.3	61	38	37.5			
Pisidium compressum									
Pisidium conventus	10	10	5.3				20	13	16.7
Pisidium fallax	10	10	5.3	51	33	31.3	30	21	25.0
Pisidium henslowanum	20	20	10.5				40	30	33.3
Pisidium lilljeborgi	10	10	5.3						
Pisidium nitidum f. nitidum	101	20	52.6	30	21	18.8	30	14	25.0
Pisidium nitidum f. pauperculum	20	20	10.5						
Pisidium supinum									
Pisidium variabile									
Pisidium walkeri									
Pisidium spp.	10	10	5.3	20	13	12.5			
Total Sphaerium				30	21		20	20	
Sphaerium nitidum							20	20	100
Sphaerium striatinum									
Sphaerium transversum				30	21	100			

APPENDIX 4. Continued.

	MONTH: October					DEPTH: 12 meters			
	Inner Region			Intermediate Region			Outer Region		
Taxa	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Gastropoda	40	30		10	10		71	29	
Valvata sincera	30	21	75.0	10	10	100	10	10	14.3
Valvata sp.									
Amnicola sp.							30	14	42.9
Bythinia tentaculata									
Lymnaea sp.	10	10	25.0				30	21	42.9
Total Pelecypoda	374	185		394	131		232	109	
Total *Pisidium*	374	185		394	131		232	109	
Pisidium adamsi	20	20	5.4						
Pisidium casertanum	111	80	29.7	51	33	12.8	40	30	17.4
Pisidium compressum				20	20	5.1			
Pisidium conventus	10	10	2.7				10	10	4.3
Pisidium fallax	40	30	10.8	40	30	10.3	30	30	13.0
Pisidium henslowanum	30	21	8.1	81	30	20.5			
Pisidium lilljeborgi									
Pisidium nitidum f. *nitidum*	81	37	21.6	121	38	30.8	101	46	43.5
Pisidium nitidum f. *pauperculum*	10	10	2.7	30	21	7.7			
Pisidium supinum									
Pisidium variabile	20	13	5.4						
Pisidium walkeri									
Pisidium spp.	51	24	13.5	51	29	12.8	51	33	21.7
Total *Sphaerium*									
Sphaerium nitidum									
Sphaerium striatinum									
Sphaerium transversum									

APPENDIX 4. Continued.

	MONTH: October					DEPTH: 15 meters			
	Inner Region			Intermediate Region			Outer Region		
Taxa	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Gastropoda	303	83		51	51		91	49	
Valvata sincera	303	83	100.0	40	40	80.0	91	49	100.0
Valvata sp.									
Amnicola sp.									
Bythinia tentaculata				10	10	20.0			
Lymnaea sp.									
Total Pelecypoda	929	351		949	470		778	339	
Total *Pisidium*	909	347		929	452		778	339	
Pisidium adamsi									
Pisidium casertanum	172	77	18.9	242	128	26.1	141	66	18.2
Pisidium compressum	20	20	2.2						
Pisidium conventus	10	10	1.1	30	21	3.3	30	21	3.9
Pisidium fallax	61	38	6.7	141	73	15.2	81	34	10.4
Pisidium henslowanum	81	43	8.9	202	103	21.7	131	76	16.9
Pisidium lilljeborgi				10	10	1.1	40	30	5.2
Pisidium nitidum f. *nitidum*	333	166	36.7	152	96	16.3	263	128	33.8
Pisidium nitidum f. *pauperculum*	20	13	2.2	20	13	2.2	10	10	1.3
Pisidium supinum									
Pisidium variabile	10	10	1.1	40	30	4.3			
Pisidium walkeri				30	30	3.3			
Pisidium spp.	202	82	22.2	61	49	6.5	81	40	10.4
Total *Sphaerium*	20	13		20	20				
Sphaerium nitidum									
Sphaerium striatinum	20	13	100.0	10	10	50.0			
Sphaerium transversum				10	10	50.0			

APPENDIX 5. Mean densities (number m^{-2}) of P. hoyi, miscellaneous taxa and total animals present at each station sampled in 1978 near the J. H. Campbell Plant, eastern Lake Michigan. In addition to mean and standard error, size classes of P. hoyi at each depth have been expressed as percentages of total P. hoyi. ($\overline{X}$ = mean, S.E. = standard error, n = 3).

MONTH: April TRANSECT: North 1

Taxa	3 meters			6 meters			9 meters			12 meters			15 meters		
	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Pontoporeia hoyi							1596	1506		1701	1701		4565	1647	
P. hoyi < 3 mm							1576	1486	98.7	1010	1010	94.3	4262	1612	93.4
P. hoyi 3-5 mm															
P. hoyi 5-7 mm															
P. hoyi > 7 mm															
P. hoyi gravid										40	40	3.7	101	40	2.2
P. hoyi spent							20	20	1.3	20	20	1.9	202	73	4.4
Miscellaneous Taxa	40	20													
Turbellaria	40	20													
Hydracarina															
Hydra sp.															
Gammarus sp.															
Total Animals	141	20		101	20		7494	980		1636	1280		9130	3086	

MONTH: April TRANSECT: South 1

Taxa	3 meters			6 meters			9 meters			12 meters			15 meters		
	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Pontoporeia hoyi							485	485		404	285		727	311	
P. hoyi < 3 mm							465	465	95.9	283	283	70.0	303	245	41.7
P. hoyi 3-5 mm															
P. hoyi 5-7 mm													20	20	2.7
P. hoyi > 7 mm															
P. hoyi gravid										20	20	4.9	222	81	30.5
P. hoyi spent							20	20	4.1	101	20	25.0	182	105	25.0
Miscellaneous Taxa															
Turbellaria															
Hydracarina															
Hydra sp.															
Gammarus sp.															
Total Animals	283	81		121	35		2060	791		5191	1443		4505	411	

APPENDIX 5. Continued.

MONTH: April TRANSECT: North 2

Taxa	3 meters X̄	3 meters S.E.	3 meters %	6 meters X̄	6 meters S.E.	6 meters %	9 meters X̄	9 meters S.E.	9 meters %	12 meters X̄	12 meters S.E.	12 meters %	15 meters X̄	15 meters S.E.	15 meters %
Total *Pontoporeia hoyi*							61	35		545	245		1899	992	
P. hoyi < 3 mm										404	211	74.1	1293	838	68.1
P. hoyi 3-5 mm															
P. hoyi 5-7 mm															
P. hoyi > 7 mm							20	20	32.8						
P. hoyi gravid							20	20	32.8	40	20	7.3	222	73	11.7
P. hoyi spent							20	20	32.8	101	20	18.5	384	173	20.2
Miscellaneous Taxa	182	105		121	61								20	20	
Turbellaria	162	107		121	61										
Hydracarina	20	20													
Hydra sp.													20	20	
Gammarus sp.															
Total Animals	384	193		384	112		4767	1602		5434	895		7777	1668	

MONTH: April TRANSECT: South 2

Taxa	3 meters X̄	3 meters S.E.	3 meters %	6 meters X̄	6 meters S.E.	6 meters %	9 meters X̄	9 meters S.E.	9 meters %	12 meters X̄	12 meters S.E.	12 meters %	15 meters X̄	15 meters S.E.	15 meters %
Total *Pontoporeia hoyi*							626	538		41	20		1313	1131	
P. hoyi < 3 mm							606	518	96.8	61	61	43.3	1111	1081	84.6
P. hoyi 3-5 mm										20	20	14.2			
P. hoyi 5-7 mm															
P. hoyi > 7 mm															
P. hoyi gravid										40	40	28.4	61	61	4.6
P. hoyi spent							20	20	3.2	20	20	14.2	141	88	10.7
Miscellaneous Taxa	61	61		121	70										
Turbellaria	61	61		121	70										
Hydracarina															
Hydra sp.															
Gammarus sp.															
Total Animals	101	53		343	225		3878	1684		8019	580		3414	1364	

APPENDIX 5. Continued.

MONTH: April TRANSECT: North 3

Taxa	3 meters			6 meters			9 meters			12 meters			15 meters		
	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%
Total *Pontoporeia hoyi*							81	40		364	218		545	105	
P. hoyi < 3 mm										141	112	38.7	61	61	11.2
P. hoyi 3-5 mm							20	20	24.7	20	20	5.5			
P. hoyi 5-7 mm															
P. hoyi > 7 mm										20	20	5.5			
P. hoyi gravid							20	20	24.7	61	61	16.8	162	88	29.7
P. hoyi spent							40	40	49.4	121	35	33.2	323	141	59.3
Miscellaneous Taxa															
Turbellaria															
Hydracarina															
Hydra sp.															
Gammarus sp.															
Total Animals							4949	1045		7232	1454		7454	1096	

MONTH: April TRANSECT: South 3

Taxa	3 meters			6 meters			9 meters			12 meters			15 meters		
	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%
Total *Pontoporeia hoyi*										61	35				
P. hoyi < 3 mm															
P. hoyi 3-5 mm															
P. hoyi 5-7 mm															
P. hoyi > 7 mm															
P. hoyi gravid										40	40	66.7			
P. hoyi spent										20	20	33.3			
Miscellaneous Taxa															
Turbellaria															
Hydracarina															
Hydra sp.															
Gammarus sp.															
Total Animals				364	105		4646	898		7555	424		2363	287	

APPENDIX 5. Continued.

MONTH: July TRANSECT: North 1

Taxa	3 meters X̄	S.E.	%	6 meters X̄	S.E.	%	9 meters X̄	S.E.	%	12 meters X̄	S.E.	%	15 meters X̄	S.E.	%
Total *Pontoporeia hoyi*	40	40		20	20		1515	378		5858	569		8989	2084	
P. hoyi < 3 mm				20	20	100.0	242	70	16.0	2121	426	36.0	6565	1193	73.0
P. hoyi 3-5 mm	20	20	50.0				1273	334	84.0	3737	193	64.0	2424	610	27.0
P. hoyi 5-7 mm															
P. hoyi > 7 mm	20	20	50.0												
P. hoyi gravid															
P. hoyi spent															
Miscellaneous Taxa															
Turbellaria															
Hydracarina															
Hydra sp.															
Gammarus sp.															
Total Animals	2788	185		4707	1191		8242	2319		12080	510		11373	2637	

MONTH: July TRANSECT: South 1

Taxa	3 meters X̄	S.E.	%	6 meters X̄	S.E.	%	9 meters X̄	S.E.	%	12 meters X̄	S.E.	%	15 meters X̄	S.E.	%
Total *Pontoporeia hoyi*				141	81		1798	502		4727	1899		11756	653	
P. hoyi < 3 mm				61		43.0	485	185	27.0	1555	660	32.9	8928	437	75.9
P. hoyi 3-5 mm				81	81	57.0	1313	317	73.0	3171	1243	67.1	2828	225	24.1
P. hoyi 5-7 mm															
P. hoyi > 7 mm															
P. hoyi gravid															
P. hoyi spent															
Miscellaneous Taxa				20	20		101	20		202	40		20	20	
Turbellaria										162	20		20	20	
Hydracarina				20	20		81	20							
Hydra sp.							20	20		40	20				
Gammarus sp.															
Total Animals	3717	283		5414	660		10443	1159		11453	5112		14695	263	

APPENDIX 5. Continued.

MONTH: July TRANSECT: North 2

Taxa	3 meters $\overline{X}$	3 meters S.E.	3 meters %	6 meters $\overline{X}$	6 meters S.E.	6 meters %	9 meters $\overline{X}$	9 meters S.E.	9 meters %	12 meters $\overline{X}$	12 meters S.E.	12 meters %	15 meters $\overline{X}$	15 meters S.E.	15 meters %
Total *Pontoporeia hoyi*				121	35		1252	53		6444	272		11292	936	
P. hoyi < 3 mm				61	35	50.0	465	40	37.1	3474	193	53.9	8969	1043	79.4
P. hoyi 3-5 mm				61	35	50.0	788	35	62.9	2949	211	45.8	2303	152	20.4
P. hoyi 5-7 mm										20	20	0.3	20	20	0.2
P. hoyi > 7 mm															
P. hoyi gravid															
P. hoyi spent															
Miscellaneous Taxa							20	20		20	20		20	20	
Turbellaria							20	20							
Hydracarina															
Hydra sp.										20	20		20	20	
Gammarus sp.															
Total Animals	1616	142		4646	972		9777	1359		12989	1880		20786	5536	

MONTH: July TRANSECT: South 2

Taxa	3 meters $\overline{X}$	3 meters S.E.	3 meters %	6 meters $\overline{X}$	6 meters S.E.	6 meters %	9 meters $\overline{X}$	9 meters S.E.	9 meters %	12 meters $\overline{X}$	12 meters S.E.	12 meters %	15 meters $\overline{X}$	15 meters S.E.	15 meters %
Total *Pontoporeia hoyi*	40	20		20	20		1858	193		5959	650		6989	1409	
P. hoyi < 3 mm							364	152	19.6	1434	298	24.1	5777	1208	82.7
P. hoyi 3-5 mm	40	20	100.0	20	20	100.0	1475	141	79.4	4525	437	75.9	1172	248	16.8
P. hoyi 5-7 mm							20	20	1.1				40	40	0.6
P. hoyi > 7 mm															
P. hoyi gravid															
P. hoyi spent															
Miscellaneous Taxa							101	20		61	35		40	20	
Turbellaria							20	20		20	20				
Hydracarina							81	20		20	20		20	20	
Hydra sp.										20	20		20	20	
Gammarus sp.															
Total Animals	2081	354		3474	677		13756	1384		16968	2098		12867	735	

APPENDIX 5. Continued.

MONTH: July TRANSECT: North 3

Taxa	3 meters X̄	3 meters S.E.	3 meters %	6 meters X̄	6 meters S.E.	6 meters %	9 meters X̄	9 meters S.E.	9 meters %	12 meters X̄	12 meters S.E.	12 meters %	15 meters X̄	15 meters S.E.	15 meters %
Total *Pontoporeia hoyi*				101	40		949	107		4646	554		13433	860	
P. hoyi < 3 mm				20	20	19.8	323	112	34.0	2323	141	50.0	11292	735	84.1
P. hoyi 3-5 mm				81	53	80.2	626	20	66.0	2323	490	50.0	2121	121	15.8
P. hoyi 5-7 mm													20	20	0.1
P. hoyi > 7 mm															
P. hoyi gravid															
P. hoyi spent															
Miscellaneous Taxa							61	35		20	20		20	20	
Turbellaria													20	20	
Hydracarina															
Hydra sp.							61	35		20	20				
Gammarus sp.															
Total Animals	1656	314		3656	141		11433	666		17473	4722		23351	3223	

MONTH: July TRANSECT: South 3

Taxa	3 meters X̄	3 meters S.E.	3 meters %	6 meters X̄	6 meters S.E.	6 meters %	9 meters X̄	9 meters S.E.	9 meters %	12 meters X̄	12 meters S.E.	12 meters %	15 meters X̄	15 meters S.E.	15 meters %
Total *Pontoporeia hoyi*				40	40		889	73		4060	160		8322	2028	
P. hoyi < 3 mm				40	40	100.0	424	152	47.7	2303	105	56.7	7494	1921	90.0
P. hoyi 3-5 mm							465	88	52.3	1757	264	43.3	808	88	9.7
P. hoyi 5-7 mm													20	20	0.2
P. hoyi > 7 mm															
P. hoyi gravid															
P. hoyi spent															
Miscellaneous Taxa							121	35		61	35				
Turbellaria							20	20		20	20				
Hydracarina							40	20							
Hydra sp.							61	35		40	40				
Gammarus sp.															
Total Animals	2101	158		7514	1191		11070	1794		13372	2349		10746	2306	

APPENDIX 5. Continued.

MONTH: October TRANSECT: North 1

Taxa	3 meters X̄	S.E.	%	6 meters X̄	S.E.	%	9 meters X̄	S.E.	%	12 meters X̄	S.E.	%	15 meters X̄	S.E.	%
Total *Pontoporeia hoyi*							505	73		1232	193		5151	563	
P. hoyi < 3 mm													81	81	1.6
P. hoyi 3-5 mm							505	73	100	1232	193	100	5030	481	97.7
P. hoyi 5-7 mm													40	20	0.8
P. hoyi > 7 mm															
P. hoyi gravid															
P. hoyi spent															
Miscellaneous Taxa	81	53		20	20		242	126		707	141		667	576	
Turbellaria	81	53		20	20		242	126		707	141		586	556	
Hydracarina													81	20	
Hydra sp.															
Gammarus sp.															
Total Animals	182	35		1879	648		7413	761		9272	1053		14887	3667	

MONTH: October TRANSECT: South 1

Taxa	3 meters X̄	S.E.	%	6 meters X̄	S.E.	%	9 meters X̄	S.E.	%	12 meters X̄	S.E.	%	15 meters X̄	S.E.	%
Total *Pontoporeia hoyi*				40	40		505	142		1777	173		2646	650	
P. hoyi < 3 mm															
P. hoyi 3-5 mm				20	20	50.0	505	142	100	1737	132	97.7	2626	670	99.2
P. hoyi 5-7 mm				20	20	50.0				40	40	2.2	20	20	0.8
P. hoyi > 7 mm															
P. hoyi gravid															
P. hoyi spent															
Miscellaneous Taxa				81	20		162	40		424	182		566	233	
Turbellaria				81	20		141	53		424	182		545	213	
Hydracarina							20	20					20	20	
Hydra sp.															
Gammarus sp.															
Total Animals	707	20		16604	8389		6464	1870		7131	1652		6403	864	

APPENDIX 5. Continued.

MONTH: October TRANSECT: North 2

Taxa	3 meters			6 meters			9 meters			12 meters			15 meters		
	X̄	S.E.	%	X̄	S.E.	%	X̄	S.E.	%	X̄	S.E.	%	X̄	S.E.	%
Total *Pontoporeia hoyi*							505	73		1091	185		3676	165	
P. hoyi < 3 mm										20	20	1.8	40	20	1.1
P. hoyi 3-5 mm							505	73	100	1071	165	98.2	3595	173	97.8
P. hoyi 5-7 mm													40	20	1.1
P. hoyi > 7 mm															
P. hoyi gravid															
P. hoyi spent															
Miscellaneous Taxa	1333	699		61	61		81	20		689	357		1192	193	
Turbellaria	1333	699		61	61		81	20		626	385		1050	199	
Hydracarina										40	20		141	40	
Hydra sp.															
Gammarus sp.										20	20				
Total Animals	1515	607		7009	2851		7716	570		7030	1245		19453	2719	

MONTH: October TRANSECT: South 2

Taxa	3 meters			6 meters			9 meters			12 meters			15 meters		
	X̄	S.E.	%	X̄	S.E.	%	X̄	S.E.	%	X̄	S.E.	%	X̄	S.E.	%
Total *Pontoporeia hoyi*				40	40		626	263		646	158		3030	245	
P. hoyi < 3 mm							20	20	3.2				61	35	2.0
P. hoyi 3-5 mm				40	40	100.0	606	245	96.8	646	158	100	2969	193	98.0
P. hoyi 5-7 mm															
P. hoyi > 7 mm															
P. hoyi gravid															
P. hoyi spent															
Miscellaneous Taxa	20	20					121	35		202	53		384	146	
Turbellaria	20	20					121	35		202	53		384	146	
Hydracarina															
Hydra sp.															
Gammarus sp.															
Total Animals	485	61		1212	508		7716	1269		5636	1669		5555	477	

APPENDIX 5. Continued.

MONTH: October TRANSECT: North 3

Taxa	3 meters $\overline{X}$	3 meters S.E.	3 meters %	6 meters $\overline{X}$	6 meters S.E.	6 meters %	9 meters $\overline{X}$	9 meters S.E.	9 meters %	12 meters $\overline{X}$	12 meters S.E.	12 meters %	15 meters $\overline{X}$	15 meters S.E.	15 meters %
Total *Pontoporeia hoyi*				81	40		404	101		949	248		2687	233	
P. hoyi < 3 mm							40	40	9.9				40	20	1.5
P. hoyi 3-5 mm				81	40	100.0	364	61	90.1	949	248	100	2646	222	98.5
P. hoyi 5-7 mm															
P. hoyi > 7 mm															
P. hoyi gravid															
P. hoyi spent															
Miscellaneous Taxa	1899	952		121	121		808	450		1333	305		1071	531	
Turbellaria	1899	952		121	121		788	463		1333	305		949	440	
Hydracarina							20	20					121	93	
Hydra sp.															
Gammarus sp.															
Total Animals	2121	1072		3636	762		8585	2299		10969	530		14786	585	

MONTH: October TRANSECT: South 3

Taxa	3 meters $\overline{X}$	3 meters S.E.	3 meters %	6 meters $\overline{X}$	6 meters S.E.	6 meters %	9 meters $\overline{X}$	9 meters S.E.	9 meters %	12 meters $\overline{X}$	12 meters S.E.	12 meters %	15 meters $\overline{X}$	15 meters S.E.	15 meters %
Total *Pontoporeia hoyi*				20	20		404	53		848	92		1677	53	
P. hoyi < 3 mm							20	20	5.0				20	20	1.2
P. hoyi 3-5 mm				20	20	100.0	384	53	95.0	848	92	100.0	1576	35	94.0
P. hoyi 5-7 mm													81	40	4.8
P. hoyi > 7 mm															
P. hoyi gravid															
P. hoyi spent															
Miscellaneous Taxa	505	225		121	70		808	293		424	70		788	126	
Turbellaria	505	225		121	70		808	293		424	70		768	132	
Hydracarina															
Hydra sp.													20	20	
Gammarus sp.															
Total Animals	788	182		5999	1335		11070	696		5212	708		4666	505	

APPENDIX 6. Mean densities (number m^{-2}) of chironomid taxa present at each station sampled in 1978 near the J. H. Campbell Plant, eastern Lake Michigan. In addition to mean and standard error, chironomid taxa at each depth have been expressed as a percentage of total chironomids. ($\bar{X}$ = mean, S.E. = standard error, n = 3).

MONTH: April TRANSECT: North 1

Taxa	3 meters			6 meters			9 meters			12 meters			15 meters		
	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%
Total Chironomidae	101	20		101	20		3010	739		283	88		1151	161	
Chironomus sp.							40	40	1.3						
Chironomus fluviatilis-gr.				40	20	39.6	384	146	12.8	40	40	14.1	20	20	1.7
Chironomus halophilus-gr.															
Cryptochironomus sp. 1															
Cryptochironomus sp. 2							121	61	4.0	61	61	21.6	20	20	1.7
Cryptochironomus sp. 3							20	20	0.7						
Cryptochironomus cf. rolli				20	20	19.8				20	20	7.1			
Parachironomus cf. abortivus															
Paracladopelma cf. nereis															
Paracladopelma cf. undine															
Paracladopelma camptolabis-gr.				20	20	19.8	727	252	24.2	20	20	7.1	263	107	22.9
Paracladopelma cf. winnelli													40	40	3.5
Robackia cf. demeijerei	20	20	19.8												
Saetheria cf. tylus	20	20	19.8				384	123	12.8	20	20	7.1	384	20	33.4
Polypedilum cf. scalaenum							949	283	31.5				101	53	8.8
Polypedilum fallax-gr.													40	20	3.5
Polypedilum sp. 2															
Cladotanytarsus sp.							343	81	11.4	40	40	14.1			
Micropsectra sp.															
Tanytarsus sp.															
Psectrocladius sp.	61	35	59.4												
Cricotopus sp.															
Heterotrissocladius cf. changi							20	20	0.7				101	53	8.8
Hydrobaenus sp.				20	20	19.8				61	61	21.6	101	101	8.8
Orthocladius (O.) sp. 1															
Orthocladius (O.) sp. 2															
Orthocladius (E.) sp.															
Parakiefferiella sp.							20	20	0.7						
Monodiamesa cf. tuberculata										20	20	7.1	81	40	7.0
Potthastia cf. longimanus															
Procladius sp.															
Others															

APPENDIX 6. Continued.

MONTH: April TRANSECT: South 1

Taxa	3 meters			6 meters			9 meters			12 meters			15 meters		
	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Chironomidae	263	73		121	35		1273	264		2505	742		1232	81	
Chironomus sp.															
Chironomus fluviatilis-gr.							81	40	6.4	81	53	3.2			
Chironomus halophilus-gr.															
Cryptochironomus sp. 1															
Cryptochironomus sp. 2							61	35	4.8	101	53	4.0	61	35	5.0
Cryptochironomus sp. 3							40	20	3.1						
Cryptochironomus cf. rolli	20	20	7.6	20	20	16.5				20	20	0.8	20	20	1.6
Parachironomus cf. abortivus															
Paracladopelma cf. nereis															
Paracladopelma cf. undine															
Paracladopelma camptolabis-gr.							545	175	42.8	525	101	21.0	101	40	8.2
Paracladopelma cf. winnelli							20	20	1.6	20	20	0.8	61	35	5.0
Robackia cf. demeijerei	202	40	76.8				40	40	3.1						
Saetheria cf. tylus				40	20	33.1	182	35	14.3	1333	576	53.2	303	105	24.6
Polypedilum cf. scalaenum							202	112	15.9	242	140	9.7	141	20	11.4
Polypedilum fallax-gr.													81	20	6.6
Polypedilum sp. 2															
Cladotanytarsus sp.	20	20	7.6				40	40	3.1	61	61	2.4			
Micropsectra sp.															
Tanytarsus sp.															
Psectrocladius sp.	20	20	7.6	40	20	33.1	40	40	3.1						
Cricotopus sp.										20	20	0.8			
Heterotrissocladius cf. changi													40	20	3.2
Hydrobaenus sp.				20	20	16.5				81	40	3.2	81	20	6.6
Orthocladius (O.) sp. 1															
Orthocladius (O.) sp. 2															
Orthocladius (E.) sp.															
Parakiefferiella sp.															
Monodiamesa cf. tuberculata							20	20	1.6	20	20	0.8	343	112	27.8
Potthastia cf. longimanus															
Procladius sp.															
Others															

APPENDIX 6. Continued.

MONTH: April TRANSECT: North 2

Taxa	3 meters			6 meters			9 meters			12 meters			15 meters		
	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Chironomidae	182	105		222	101		2788	1033		2767	331		1454	455	
Chironomus sp.							101	40	3.6						
Chironomus fluviatilis-gr.							424		15.2	20	20	0.7			
Chironomus halophilus-gr.															
Cryptochironomus sp. 1															
Cryptochironomus sp. 2							61		2.2	101	53	3.7	81	40	5.6
Cryptochironomus sp. 3							61	61	2.2						
Cryptochironomus cf. rolli										20	20	0.7			
Parachironomus cf. abortivus															
Paracladopelma cf. nereis															
Paracladopelma cf. undine															
Paracladopelma camptolabis-gr.							687	317	24.6	485	70	17.5	162	88	11.1
Paracladopelma cf. winnelli													20	20	1.4
Robackia cf. demeijerei	182	105	100.0	141	88	63.5									
Saetheria cf. tylus				81	40	36.5	323	193	11.6	1252	233	45.2	586	258	40.3
Polypedilum cf. scalaenum							626	350	22.5	505	225	18.3	242	105	16.6
Polypedilum fallax-gr.										20	20	0.7	20	20	1.4
Polypedilum sp. 2															
Cladotanytarsus sp.							485	264	17.4	182	61	6.6			
Micropsectra sp.															
Tanytarsus sp.															
Psectrocladius sp.															
Cricotopus sp.							20	20	0.7						
Heterotrissocladius cf. changi										20	20	0.7	101	53	6.9
Hydrobaenus sp.										162	81	5.9	121	93	8.3
Orthocladius (O.) sp. 1															
Orthocladius (O.) sp. 2															
Orthocladius (E.) sp.															
Parakiefferiella sp.															
Monodiamesa cf. tuberculata													121	93	8.3
Potthastia cf. longimanus															
Procladius sp.															
Others															

APPENDIX 6. Continued.

MONTH: April TRANSECT: South 2

Taxa	3 meters X̄	3 meters S.E.	3 meters %	6 meters X̄	6 meters S.E.	6 meters %	9 meters X̄	9 meters S.E.	9 meters %	12 meters X̄	12 meters S.E.	12 meters %	15 meters X̄	15 meters S.E.	15 meters %
Total Chironomidae	40	40		222	162		2525	1345		5171	888		1171	616	
Chironomus sp.							20	20	0.8	40	40	0.8			
Chironomus fluviatilis-gr.							121	70	4.8	141	20	2.7	20	20	1.7
Chironomus halophilus-gr.															
Cryptochironomus sp. 1															
Cryptochironomus sp. 2							101	40	4.0	162	53	3.1	61	35	5.2
Cryptochironomus sp. 3							61	61	2.4	61	35	1.2			
Cryptochironomus cf. rolli							40	20	1.6	61		1.2	20	20	1.7
Parachironomus cf. abortivus							20	20	0.8						
Paracladopelma cf. nereis															
Paracladopelma cf. undine															
Paracladopelma camptolabis-gr.				20	20	9.0	505	199	20.0	1374	267	26.6	141	81	12.0
Paracladopelma cf. winnelli															
Robackia cf. demeijerei				182	153	82.0									
Saetheria cf. tylus	20	20	50.0				808	657	32.0	1919	162	37.1	747	443	63.9
Polypedilum cf. scalaenum							384	199	15.2	667	385	12.9	40	20	3.4
Polypedilum fallax-gr.										20	20	0.4			
Polypedilum sp. 2															
Cladotanytarsus sp.							444	414	17.6	545	305	10.5			
Micropsectra sp.															
Tanytarsus sp.															
Psectrocladius sp.				20	20	9.0				20	20	0.4			
Cricotopus sp.	20	20	50.0												
Heterotrissocladius cf. changi													20	20	1.7
Hydrobaenus sp.							20	20	0.8	101	73	2.0	121	70	10.3
Orthocladius (O.) sp. 1															
Orthocladius (O.) sp. 2															
Orthocladius (E.) sp.															
Parakiefferiella sp.															
Monodiamesa cf. tuberculata										61	35	1.2			
Potthastia cf. longimanus															
Procladius sp.															
Others															

APPENDIX 6. Continued.

MONTH: April TRANSECT: North 3

Taxa	3 meters			6 meters			9 meters			12 meters			15 meters		
	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%
Total Chironomidae				20	20		2808	267		3939	1212		1838	193	
Chironomus sp.							40	20	1.4	81	53	2.1			
Chironomus fluviatilis-gr.							162	73	5.8	61	35	1.5	61	35	3.3
Chironomus halophilus-gr.							40	20	1.4						
Cryptochironomus sp. 1															
Cryptochironomus sp. 2							81	53	2.9	101	20	2.6	81	40	4.4
Cryptochironomus sp. 3															
Cryptochironomus cf. *rolli*							81	53	2.9	40	20	1.0	20	20	1.1
Parachironomus cf. *abortivus*							20	20	0.7						
Paracladopelma cf. *nereis*															
Paracladopelma cf. *undine*															
Paracladopelma camptolabis-gr.							707	141	25.2	707	141	17.9	81	53	4.4
Paracladopelma cf. *winnelli*													20	20	1.1
Robackia cf. *demeijerei*															
Saetheria cf. *tylus*							1071	222	38.1	1778	478	45.1	909	195	49.5
Polypedilum cf. *scalaenum*							384	265	13.7	747	323	19.0	202	53	11.0
Polypedilum fallax-gr.							20	20	0.7	40	40	1.0	101	20	5.5
Polypedilum sp. 2															
Cladotanytarsus sp.							162	53	5.8	242	140	6.1	61	35	3.3
Micropsectra sp.															
Tanytarsus sp.															
Psectrocladius sp.															
Cricotopus sp.															
Heterotrissocladius cf. *changi*													20	20	1.1
Hydrobaenus sp.				20	20	100.0	20	20	0.7	101	73	2.6	121	35	6.6
Orthocladius (*O.*) sp. 1															
Orthocladius (*O.*) sp. 2													20	20	1.1
Orthocladius (*E.*) sp.															
Parakiefferiella sp.															
Monodiamesa cf. *tuberculata*							20	20	0.7	40	20	1.0	141	112	7.7
Potthastia cf. *longimanus*															
Procladius sp.															
Others															

APPENDIX 6. Continued.

	MONTH: April								TRANSECT: South 3						
	3 meters			6 meters			9 meters			12 meters			15 meters		
Taxa	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%
Total Chironomidae				242	105		2808	666		4363	403		2121	161	
Chironomus sp.							121	35	4.3	40	40	0.9			
Chironomus fluviatilis-gr.				121	61	50.0	343	88	12.2	81	53	1.9	61	35	2.9
Chironomus halophilus-gr.															
Cryptochironomus sp. 1										20	20	0.5			
Cryptochironomus sp. 2				20	20	8.3	61	61	2.2	162	53	3.7			
Cryptochironomus sp. 3				61	35	25.2									
Cryptochironomus cf. *rolli*				20	20	8.3	40	20	1.4	20	20	0.5			
Parachironomus cf. *abortivus*															
Paracladopelma cf. *nereis*															
Paracladopelma cf. *undine*															
Paracladopelma camptolabis-gr.				20	20	8.3	1111	225	39.6	990	162	22.7	20	20	0.9
Paracladopelma cf. *winnelli*															
Robackia cf. *demeijerei*													81	53	3.8
Saetheria cf. *tylus*							283	40	10.1	1495	158	34.3	1071	123	50.5
Polypedilum cf. *scalaenum*							586	316	20.9	808	123	18.5	40	40	1.9
Polypedilum fallax-gr.										40	20	0.9			
Polypedilum sp. 2															
Cladotanytarsus sp.							263	88	9.4	485	195	11.1			
Micropsectra sp.															
Tanytarsus sp.															
Psectrocladius sp.															
Cricotopus sp.															
Heterotrissocladius cf. *changi*										60	35	1.4			
Hydrobaenus sp.										121	61	2.8	848	153	40.0
Orthocladius (*O.*) sp. 1															
Orthocladius (*O.*) sp. 2															
Orthocladius (*E.*) sp.															
Parakiefferiella sp.															
Monodiamesa cf. *tuberculata*										20	20	0.5			
Potthastia cf. *longimanus*										20	20	0.5			
Procladius sp.															
Others															

APPENDIX 6. Continued.

	MONTH: July								TRANSECT: North 1						
	3 meters			6 meters			9 meters			12 meters			15 meters		
Taxa	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Chironomidae	2626	228		2666	364		2586	475		1656	336		1172	81	
Chironomus sp.	81	20	3.1	202	112	7.6	20	20	0.8	40	40	2.4			
Chironomus fluviatilis-gr.	808	123	30.8	1495	302	56.1	747	176	28.9	121	70	7.3			
Chironomus halophilus-gr.															
Cryptochironomus sp. 1	121	70	4.6	20	20	0.8									
Cryptochironomus sp. 2							242	93	9.4				40	20	3.4
Cryptochironomus sp. 3															
Cryptochironomus cf. *rolli*	40	20	1.5				40	40	1.5						
Parachironomus cf. *abortivus*															
Paracladopelma cf. *nereis*	20	20	0.8												
Paracladopelma cf. *undine*	81	81	3.1	141	53	5.3	20	20	0.8	40	20	2.4	40	20	3.4
Paracladopelma camptolabis-gr.				162	40	6.1	20	20	0.8	20	20	1.2	40	40	3.4
Paracladopelma cf. *winnelli*	20	20	0.8				40	20	1.5	81	20	4.9	101	20	8.6
Robackia cf. *demeijerei*	1172	298	44.6	444	83	16.7	424	153	16.4	182	35	11.0	20	20	1.7
Saetheria cf. *tylus*	283	40	10.8	101	53	3.8	20	20	0.8				40	20	3.4
Polypedilum cf. *scalaenum*				20	20	0.8	343	193	13.3	323	165	19.5	202	101	17.2
Polypedilum fallax-gr.															
Polypedilum sp. 2															
Cladotanytarsus sp.				20	20	0.8	485	93	18.8	202	53	12.2			
Micropsectra sp.										323	158	19.5	61		5.2
Tanytarsus sp.															
Psectrocladius sp.				40	40	1.5	40	20	1.5	101	73	6.1			
Cricotopus sp.															
Heterotrissocladius cf. *changi*							20	20	0.8	101	53	6.1			
Hydrobaenus sp.										20	20	1.2	525	222	44.8
Orthocladius (*O.*) sp. 1							101	20	3.9				40	20	3.4
Orthocladius (*O.*) sp. 2															
Orthocladius (*E.*) sp.				20	20	0.8									
Parakiefferiella sp.							20	20	1.5	20	20	1.2			
Monodiamesa cf. *tuberculata*										81	40	4.9	61		5.2
Potthastia cf. *longimanus*															
Procladius sp.															
Others															

APPENDIX 6. Continued.

MONTH: July TRANSECT: South 1

Taxa	3 meters $\overline{X}$	3 meters S.E.	3 meters %	6 meters $\overline{X}$	6 meters S.E.	6 meters %	9 meters $\overline{X}$	9 meters S.E.	9 meters %	12 meters $\overline{X}$	12 meters S.E.	12 meters %	15 meters $\overline{X}$	15 meters S.E.	15 meters %
Total Chironomidae	2889	233		3495	107		3535	225		3939	2354		626	214	
<u>Chironomus</u> sp.	121		4.2	182	93	5.2				1838	1778	46.7	20	20	3.2
<u>Chironomus</u> <u>fluviatilis</u>-gr.	1313	40	45.4	1656	510	47.4	626	146	17.7	61	40	1.5			
<u>Chironomus</u> <u>halophilus</u>-gr.	40	20	1.4												
<u>Cryptochironomus</u> sp. 1	61	35	2.1				20	20	0.6						
<u>Cryptochironomus</u> sp. 2				81	20	2.3	141	20	4.0				40	20	6.4
<u>Cryptochironomus</u> sp. 3															
<u>Cryptochironomus</u> cf. <u>rolli</u>	141	40	4.9				20	20	0.6	40	40	1.0			
<u>Parachironomus</u> cf. <u>abortivus</u>							20	20	0.6						
<u>Paracladopelma</u> cf. <u>nereis</u>							20	20	0.6						
<u>Paracladopelma</u> cf. <u>undine</u>	40	40	1.4	61	35	1.7	20	20	0.6						
<u>Paracladopelma</u> <u>camptolabis</u>-gr.							40	20	1.1						
<u>Paracladopelma</u> cf. <u>winnelli</u>							40	20	1.1	20	20	0.5			
<u>Robackia</u> cf. <u>demeijerei</u>	768	132	26.6	970	455	27.8	465	20	13.2	101	40	2.6	20	20	3.2
<u>Saetheria</u> cf. <u>tylus</u>	323	40	11.2	323	233	9.2	61		1.7	162	107	4.1			
<u>Polypedilum</u> cf. <u>scalaenum</u>	20	20	0.7	141	53	4.0	444	265	12.6	525	233	13.3	61	35	9.7
<u>Polypedilum</u> <u>fallax</u>-gr.													81	20	12.9
<u>Polypedilum</u> sp. 2							20	20	0.6						
<u>Cladotanytarsus</u> sp.				40	20	1.1	1232	107	34.9						
<u>Micropsectra</u> sp.							20	20	0.6	606	311	15.4	162	132	25.9
<u>Tanytarsus</u> sp.										40	20	1.0			
<u>Psectrocladius</u> sp.	61		2.1	20	20	0.6	202	173	5.7	20	20	0.5			
<u>Cricotopus</u> sp.															
<u>Heterotrissocladius</u> cf. <u>changi</u>							20	20	0.6	202	107	5.1			
<u>Hydrobaenus</u> sp.										162	53	4.1	121	35	19.3
<u>Orthocladius</u> (<u>O.</u>) sp. 1				20	20	0.6	101	40	2.9	20	20	0.5			
<u>Orthocladius</u> (<u>O.</u>) sp. 2															
<u>Orthocladius</u> (<u>E.</u>) sp.															
<u>Parakiefferiella</u> sp.							20	20	0.6	81	81	2.1			
<u>Monodiamesa</u> cf. <u>tuberculata</u>										40	20	1.0			
<u>Potthastia</u> cf. <u>longimanus</u>															
<u>Procladius</u> sp.															
Others										20	20	0.5	121	61	19.3

APPENDIX 6. Continued.

MONTH: July TRANSECT: North 2

Taxa	3 meters $\overline{X}$	3 meters S.E.	3 meters %	6 meters $\overline{X}$	6 meters S.E.	6 meters %	9 meters $\overline{X}$	9 meters S.E.	9 meters %	12 meters $\overline{X}$	12 meters S.E.	12 meters %	15 meters $\overline{X}$	15 meters S.E.	15 meters %
Total Chironomidae	1616	141		2384	860		4222	1155		1899	331		1010	165	
Chironomus sp.	20	20	1.2	40	20	1.7	20	20	0.5	40	20	2.1	81	81	8.0
Chironomus fluviatilis-gr.	364	35	22.5	1091	578	45.8	667	121	15.8	141	40	7.4	20	20	2.0
Chironomus halophilus-gr.															
Cryptochironomus sp. 1	202	81	12.5							20	20	1.0			
Cryptochironomus sp. 2	40	20	2.5	40	20	1.7	202	81	4.8				20	20	2.0
Cryptochironomus sp. 3															
Cryptochironomus cf. *rolli*															
Parachironomus cf. *abortivus*															
Paracladopelma cf. *nereis*															
Paracladopelma cf. *undine*	101	73	6.3	202	73	8.5	20	20	0.5	40	20	2.1			
Paracladopelma camptolabis-gr.				242	93	10.2	121		2.9	81	53	4.3			
Paracladopelma cf. *winnelli*				20	20	0.8	20	20	0.5	61	35	3.2			
Robackia cf. *demeijerei*	646	81	40.0	424	140	17.8	202	73	4.8	40	20	2.1			
Saetheria cf. *tylus*	222	101	13.7	121	70	5.0	20	20	0.5	40	40	2.1			
Polypedilum cf. *scalaenum*				81	53	3.4	990	475	23.5	283	165	14.9	40	20	4.0
Polypedilum fallax-gr.													61	35	6.0
Polypedilum sp. 2															
Cladotanytarsus sp.				81	40	3.4	1495	771	35.4	384	113	20.2			
Micropsectra sp.							20	20	0.5	343	225	18.1	40	20	4.0
Tanytarsus sp.															
Psectrocladius sp.				40	40	1.7	222	81	5.3	20	20	1.0	20	20	2.0
Cricotopus sp.															
Heterotrissocladius cf. *changi*							81	53	1.9	61		3.2			
Hydrobaenus sp.							20	20	0.5	182	35	9.6	505	53	50.0
Orthocladius (*O.*) sp. 1							81	20	1.9	81	20	4.3			
Orthocladius (*O.*) sp. 2															
Orthocladius (*E.*) sp.															
Parakiefferiella sp.										20	20	1.0			
Monodiamesa cf. *tuberculata*							40	20	1.0	40	40	2.1	222	107	22.0
Potthastia cf. *longimanus*															
Procladius sp.										20	20	1.0			
Others	20	20	1.2												

APPENDIX 6. Continued.

	MONTH: July							TRANSECT: South 2							
	3 meters			6 meters			9 meters			12 meters			15 meters		
Taxa	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Chironomidae	2020	385		2788	529		4484	668		3596	340		3818	1506	
Chironomus sp.	20	20	1.0	40	20	1.4	182	61	4.1	222	162	6.2	40	40	1.0
Chironomus fluviatilis-gr.	222	53	11.0	828	336	29.7	970	153	21.6	566	146	15.7	20	20	0.5
Chironomus halophilus-gr.															
Cryptochironomus sp. 1	61	35	3.0	20	20	0.7									
Cryptochironomus sp. 2							101	73	2.3						
Cryptochironomus sp. 3															
Cryptochironomus cf. rolli	61	35	3.0												
Parachironomus cf. abortivus															
Paracladopelma cf. nereis	20	20	1.0				20	20	0.4	40	20	1.1			
Paracladopelma cf. undine	101	53	5.0	121	93	4.3				40	40	1.1			
Paracladopelma camptolabis-gr.				121	35	4.3	202	112	4.5	61		1.7			
Paracladopelma cf. winnelli							20	20	0.4	40	40	1.1			
Robackia cf. demeijerei	646	180	32.0	1212	378	43.5	364	105	8.1	81	53	2.3	20	20	0.5
Saetheria cf. tylus	869	317	43.0	303	70	10.9				20	20	0.6	20	20	0.5
Polypedilum cf. scalaenum				20	20	0.7	687	202	15.3	505	390	14.0	40	20	1.0
Polypedilum fallax-gr.							20	20	0.4				40	20	1.0
Polypedilum sp. 2															
Cladotanytarsus sp.							1495	483	33.3	828	165	23.0			
Micropsectra sp.							40	20	0.9	343	81	9.5	1858	1708	48.7
Tanytarsus sp.															
Psectrocladius sp.	20	20	1.0	121	61	4.3	20	20	0.4	40	20	1.1	20	20	0.5
Cricotopus sp.															
Heterotrissocladius cf. changi							121	93	2.7	141	20	3.9			
Hydrobaenus sp.							20	20	0.4	202	101	5.6	1717	779	45.0
Orthocladius (O.) sp. 1							222	40	5.0	242	105	6.7			
Orthocladius (O.) sp. 2															
Orthocladius (E.) sp.															
Parakiefferiella sp.										162	132	4.5			
Monodiamesa cf. tuberculata										61	35	1.7	40	20	1.0
Potthastia cf. longimanus															
Procladius sp.															
Others															

APPENDIX 6. Continued.

MONTH: July TRANSECT: North 3

Taxa	3 meters $\overline{X}$	3 meters S.E.	3 meters %	6 meters $\overline{X}$	6 meters S.E.	6 meters %	9 meters $\overline{X}$	9 meters S.E.	9 meters %	12 meters $\overline{X}$	12 meters S.E.	12 meters %	15 meters $\overline{X}$	15 meters S.E.	15 meters %
Total Chironomidae	1656	314		2384	132		4323	246		3676	1205		990	432	
Chironomus sp.	61	35	3.7							40	20	1.1	20	20	2.0
Chironomus fluviatilis-gr.	485	35	29.3	424	70	17.8	465	132	10.8	222	40	6.0			
Chironomus halophilus-gr.															
Cryptochironomus sp. 1	61		3.7												
Cryptochironomus sp. 2	20	20	1.2	20	20	0.8	222	53	5.1	61		1.7			
Cryptochironomus sp. 3															
Cryptochironomus cf. rolli															
Parachironomus cf. abortivus															
Paracladopelma cf. nereis										20	20	0.5			
Paracladopelma cf. undine	141	40	8.5	404	53	16.9	101	40	2.3	61	40	1.7			
Paracladopelma camptolabis-gr.	20	20	1.2	263	53	11.0	263	112	6.1	20	20	0.5			
Paracladopelma cf. winnelli				61		2.6	81	20	1.9	40	40	0.5	20	20	2.0
Robackia cf. demeijerei	687	211	41.5	808	176	33.9	303	61	7.0	182	40	5.0	20	20	2.0
Saetheria cf. tylus	141	88	8.5	202	20	8.5	40	40	0.9						
Polypedilum cf. scalaenum				141	53	5.9	949	317	22.0	1172	432	31.9	20	20	2.0
Polypedilum fallax-gr.										61	40	1.7	20	20	2.0
Polypedilum sp. 2															
Cladotanytarsus sp.				20	20	0.8	1596	53	36.9	202	40	5.5			
Micropsectra sp.							81	53	1.9	606	273	16.5	687	516	69.4
Tanytarsus sp.										20	20	0.5			
Psectrocladius sp.	40	20	2.4	20	20	0.8	40	20	0.9	121	40	3.3			
Cricotopus sp.															
Heterotrissocladius cf. changi							81	53	1.9	525	495	14.3			
Hydrobaenus sp.										61	40	1.7	81	53	8.2
Orthocladius (O.) sp. 1				20	20	0.8	81	20	1.9	162	53	4.4			
Orthocladius (O.) sp. 2															
Orthocladius (E.) sp.															
Parakiefferiella sp.															
Monodiamesa cf. tuberculata							20	20	0.5	81	40	2.2	121	40	12.2
Potthastia cf. longimanus															
Procladius sp.										20	20	0.5			
Others															

APPENDIX 6. Continued.

	MONTH: July								TRANSECT: South 3						
	3 meters			6 meters			9 meters			12 meters			15 meters		
Taxa	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Chironomidae	2101	158		3818	741		4969	807		4262	390		1414	390	
Chironomus sp.				202	107	5.3				61	35	1.4			
Chironomus fluviatilis-gr.	81	40	3.9	1313	132	34.4	2363	403	47.6	505	180	11.8			
Chironomus halophilus-gr.															
Cryptochironomus sp. 1	323	73	15.4												
Cryptochironomus sp. 2	40	20	1.9	101	73	2.6	162	40	3.3	40	20	0.9			
Cryptochironomus sp. 3	20	20	1.0												
Cryptochironomus cf. rolli	20	20	1.0												
Parachironomus cf. abortivus															
Paracladopelma cf. nereis				40	40	1.0									
Paracladopelma cf. undine	20	20	1.0	101	73	2.6									
Paracladopelma camptolabis-gr.				141	88	3.7	40	20	0.8	101	20	2.4	20	20	1.4
Paracladopelma cf. winnelli				20	20	0.5				81	20	1.9	61	61	4.3
Robackia cf. demeijerei	1252	141	59.6	1636	264	42.8	646	112	13.0	81	53	1.9	202	146	14.3
Saetheria cf. tylus	303	35	14.4	81	53	2.1	61		1.2	20	20	0.5	61	35	4.3
Polypedilum cf. scalaenum				101	101	2.6	566	238	11.4	525	238	12.3	61	61	4.3
Polypedilum fallax-gr.													81	53	5.7
Polypedilum sp. 2															
Cladotanytarsus sp.				20	20	0.5	889	325	17.9	384	88	9.0			
Micropsectra sp.							121	61	2.4	1313	417	30.8	121	61	8.6
Tanytarsus sp.															
Psectrocladius sp.	40	40	1.9	61	35	1.6	61		1.2	40	40	0.9			
Cricotopus sp.															
Heterotrissocladius cf. changi										424	213	9.9	20	20	1.4
Hydrobaenus sp.										222	165	5.2	747	357	52.8
Orthocladius (O.) sp. 1										303	35	7.1			
Orthocladius (O.) sp. 2							20	20	0.4						
Orthocladius (E.) sp.										81	20	1.9			
Parakiefferiella sp.							40	40	0.8	40	20	1.9			
Monodiamesa cf. tuberculata										40	20	0.9	40	40	2.8
Potthastia cf. longimanus															
Procladius sp.															
Others															

APPENDIX 6. Continued.

MONTH: October TRANSECT: North 1

Taxa	3 meters X̄	3 meters S.E.	3 meters %	6 meters X̄	6 meters S.E.	6 meters %	9 meters X̄	9 meters S.E.	9 meters %	12 meters X̄	12 meters S.E.	12 meters %	15 meters X̄	15 meters S.E.	15 meters %
Total Chironomidae	101	53		1656	635		2990	967		2444	211		566	123	
Chironomus sp.															
Chironomus fluviatilis-gr.				40	20	2.4	222	53	7.4	81	20	3.3			
Chironomus halophilus-gr.															
Cryptochironomus sp. 1															
Cryptochironomus sp. 2				101	40	6.1	263	20	8.8	283	40	11.5	182	35	32.2
Cryptochironomus sp. 3				40	40	2.4									
Cryptochironomus cf. rolli				20	20	1.2									
Parachironomus cf. abortivus															
Paracladopelma cf. nereis															
Paracladopelma cf. undine										20	20	0.8			
Paracladopelma camptolabis-gr.	61	35	60.4	485	35	29.3	1212	508	40.5	1293	81	52.9	141	20	24.9
Paracladopelma cf. winnelli															
Robackia cf. demeijerei				101	73	6.1									
Saetheria cf. tylus	40	20	39.6	848	610	51.2	384	88	12.8	162	53	6.6	20	20	3.5
Polypedilum cf. scalaenum				20	20	1.2	788	378	26.4	465	88	19.0	81	53	14.3
Polypedilum fallax-gr.															
Polypedilum sp. 2															
Cladotanytarsus sp.							61	35	2.0	20	20	0.8			
Micropsectra sp.															
Tanytarsus sp.															
Psectrocladius sp.															
Cricotopus sp.															
Heterotrissocladius cf. changi										20	20	0.8			
Hydrobaenus sp.															
Orthocladius (O.) sp. 1															
Orthocladius (O.) sp. 2															
Orthocladius (E.) sp.															
Parakiefferiella sp.							40	40	1.3	40	20	1.6			
Monodiamesa cf. tuberculata							20	20	0.7	40	20	1.6	121	35	21.4
Potthastia cf. longimanus										20	20	0.8	20	20	3.5
Procladius sp.															
Others															

APPENDIX 6. Continued.

MONTH: October TRANSECT: South 1

Taxa	3 meters $\overline{X}$	3 meters S.E.	3 meters %	6 meters $\overline{X}$	6 meters S.E.	6 meters %	9 meters $\overline{X}$	9 meters S.E.	9 meters %	12 meters $\overline{X}$	12 meters S.E.	12 meters %	15 meters $\overline{X}$	15 meters S.E.	15 meters %
Total Chironomidae	707	20		16443	8409		2363	858		1535	314		505	228	
Chironomus sp.															
Chironomus fluviatilis-gr.	81	20	11.5				40	20	1.7				20	20	4.0
Chironomus halophilus-gr.															
Cryptochironomus sp. 1															
Cryptochironomus sp. 2	101	53	14.3	40	40	0.2	182	61	7.7	202	81	13.2	20	20	4.0
Cryptochironomus sp. 3	20	20	2.8												
Cryptochironomus cf. rolli	40	20	5.7	20	20	0.2									
Parachironomus cf. abortivus															
Paracladopelma cf. nereis															
Paracladopelma cf. undine															
Paracladopelma camptolabis-gr.	242	61	34.2	323	158	2.0	1273	437	53.9	788	364	51.3	40	20	8.0
Paracladopelma cf. winnelli							20	20	0.8						
Robackia cf. demeijerei	20	20	2.8	606	490	3.7									
Saetheria cf. tylus	182	121	25.7	15453	8179	94.0	283	88	12.0	303	140	19.7	343	211	67.9
Polypedilum cf. scalaenum	20	20	2.8				444	283	18.8	40	20	2.6	61	35	12.1
Polypedilum fallax-gr.															
Polypedilum sp. 2															
Cladotanytarsus sp.							101	53	4.3	61	61	4.0			
Micropsectra sp.															
Tanytarsus sp.															
Psectrocladius sp.															
Cricotopus sp.															
Heterotrissocladius cf. changi													20	20	4.0
Hydrobaenus sp.							20	20	0.8						
Orthocladius (O.) sp. 1															
Orthocladius (O.) sp. 2															
Orthocladius (E.) sp.															
Parakiefferiella sp.										121	61	7.9			
Monodiamesa cf. tuberculata										20	20	1.3			
Potthastia cf. longimanus															
Procladius sp.															
Others															

APPENDIX 6. Continued.

MONTH: October TRANSECT: North 2

Taxa	3 meters X̄	3 meters S.E.	3 meters %	6 meters X̄	6 meters S.E.	6 meters %	9 meters X̄	9 meters S.E.	9 meters %	12 meters X̄	12 meters S.E.	12 meters %	15 meters X̄	15 meters S.E.	15 meters %
Total Chironomidae	182	93		6585	2872		4181	515		1656	146		586	173	
Chironomus sp.															
Chironomus fluviatilis-gr.							121	35	2.9	20	20	1.2			
Chironomus halophilus-gr.															
Cryptochironomus sp. 1															
Cryptochironomus sp. 2							505	141	12.1	364	70	22.0	182	93	31.1
Cryptochironomus sp. 3				40	20	0.6	20	20	0.5						
Cryptochironomus cf. *rolli*															
Parachironomus cf. *abortivus*															
Paracladopelma cf. *nereis*															
Paracladopelma cf. *undine*															
Paracladopelma camptolabis-gr.	81	53	44.5	162	81	2.5	1879	182	44.9	646	107	39.0	61	35	10.4
Paracladopelma cf. *winnelli*													20	20	3.4
Robackia cf. *demeijerei*	20	20	11.0	222	141	3.4									
Saetheria cf. *tylus*	81	53	44.5	6080	2903	92.3	384	101	9.2	182	35	11.0			
Polypedilum cf. *scalaenum*				20	20	0.3	1050	253	25.1	303	70	18.3	61	35	10.4
Polypedilum fallax-gr.															
Polypedilum sp. 2															
Cladotanytarsus sp.				61	35	0.9	141	53	3.4	40	20	2.4			
Micropsectra sp.															
Tanytarsus sp.															
Psectrocladius sp.															
Cricotopus sp.															
Heterotrissocladius cf. *changi*							20	20	0.5	20	20	1.2	121	93	20.5
Hydrobaenus sp.															
Orthocladius (O.) sp. 1															
Orthocladius (O.) sp. 2															
Orthocladius (E.) sp.															
Parakiefferiella sp.							40	20	1.0	20	20	1.2			
Monodiamesa cf. *tuberculata*							20	20	0.5				101	40	17.2
Potthastia cf. *longimanus*										61	35	3.7	40	40	6.8
Procladius sp.															
Others															

APPENDIX 6. Continued.

MONTH: October TRANSECT: South 2

Taxa	3 meters			6 meters			9 meters			12 meters			15 meters		
	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Chironomidae	465	73		970	355		3373	306		1980	258		364	105	
Chironomus sp.															
Chironomus fluviatilis-gr.				81	20	8.4	242	35	7.2						
Chironomus halophilus-gr.															
Cryptochironomus sp. 1															
Cryptochironomus sp. 2				61	35	6.3	404	162	12.0	242	93	12.2	121	70	33.2
Cryptochironomus sp. 3				40	20	4.1	20	20	0.6						
Cryptochironomus cf. *rolli*				61	35	6.3									
Parachironomus cf. *abortivus*															
Paracladopelma cf. *nereis*															
Paracladopelma cf. *undine*															
Paracladopelma camptolabis-gr.				424	286	43.7	1192	222	35.3	869	40	43.9	81	53	22.3
Paracladopelma cf. *winnelli*							20	20	0.6						
Robackia cf. *demeijerei*	121	35	26.0	61	61	6.3									
Saetheria cf. *tylus*	343	73	73.8	202	173	20.8	61	35	1.8	141	20	7.1	40	20	11.0
Polypedilum cf. *scalaenum*				20	20	2.1	1151	126	34.1	485	213	24.5			
Polypedilum fallax-gr.															
Polypedilum sp. 2															
Cladotanytarsus sp.				20	20	2.1	263	53	7.8	101	20	5.1			
Micropsectra sp.															
Tanytarsus sp.															
Psectrocladius sp.															
Cricotopus sp.															
Heterotrissocladius cf. *changi*										20	20	1.0	81	20	22.3
Hydrobaenus sp.															
Orthocladius (*O.*) sp. 1															
Orthocladius (*O.*) sp. 2															
Orthocladius (*E.*) sp.															
Parakiefferiella sp.							20	20	0.6	40	20	2.0			
Monodiamesa cf. *tuberculata*										20	20	1.0	40	40	11.0
Potthastia cf. *longimanus*										61	61	3.1			
Procladius sp.															
Others															

APPENDIX 6. Continued.

MONTH: October TRANSECT: North 3

Taxa	3 meters $\bar{X}$	3 meters S.E.	3 meters %	6 meters $\bar{X}$	6 meters S.E.	6 meters %	9 meters $\bar{X}$	9 meters S.E.	9 meters %	12 meters $\bar{X}$	12 meters S.E.	12 meters %	15 meters $\bar{X}$	15 meters S.E.	15 meters %
Total Chironomidae	222	141		3050	566		3212	928		2081	233		1050	141	
Chironomus sp.															
Chironomus fluviatilis-gr.				162	73	5.3	61	61	1.9						
Chironomus halophilus-gr.															
Cryptochironomus sp. 1															
Cryptochironomus sp. 2				182	35	6.0	364	126	11.3	283	53	13.6	283	53	27.0
Cryptochironomus sp. 3				61	61	2.0	20	20	0.6						
Cryptochironomus cf. rolli															
Parachironomus cf. abortivus															
Paracladopelma cf. nereis															
Paracladopelma cf. undine															
Paracladopelma camptolabis-gr.	61	61	27.5	1818	365	59.6	1010	193	31.4	909	185	43.7	505	176	48.1
Paracladopelma cf. winnelli															
Robackia cf. demeijerei	141	141	63.5												
Saetheria cf. tylus	20	20	9.0	182	61	6.0	424	126	13.2	485	35	23.3	81	20	7.7
Polypedilum cf. scalaenum				202	173	6.6	707	248	22.0	283	40	13.6	61		5.8
Polypedilum fallax-gr.															
Polypedilum sp. 2															
Cladotanytarsus sp.				444	88	14.6	566	228	17.6	61	35	2.9			
Micropsectra sp.															
Tanytarsus sp.															
Psectrocladius sp.															
Cricotopus sp.															
Heterotrissocladius cf. changi													81	53	7.7
Hydrobaenus sp.															
Orthocladius (O.) sp. 1															
Orthocladius (O.) sp. 2															
Orthocladius (E.) sp.															
Parakiefferiella sp.							61	35	1.9	40	20	1.9			
Monodiamesa cf. tuberculata													20	20	1.9
Potthastia cf. longimanus										20	20	1.0	20	20	1.9
Procladius sp.															
Others															

APPENDIX 6. Continued.

MONTH: October TRANSECT: South 3

Taxa	3 meters			6 meters			9 meters			12 meters			15 meters		
	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Chironomidae	222	53		3454	788		5090	459		1091	264		343	73	
Chironomus sp.															
Chironomus fluviatilis-gr.				364	153	10.5	323	53	6.3	40	20	3.7			
Chironomus halophilus-gr.															
Cryptochironomus sp. 1															
Cryptochironomus sp. 2				101	20	2.9	283	132	5,6	101	20	9.3	20	20	5.8
Cryptochironomus sp. 3				40	40	1.2	40	20	0.8						
Cryptochironomus cf. rolli				20	20	0.6	20	20	0.4						
Parachironomus cf. abortivus															
Paracladopelma cf. nereis															
Paracladopelma cf. undine															
Paracladopelma camptolabis-gr.	81	81	36.5	2182	560	63.2	2363	547	46.4	525	132	48.1	162	73	47.2
Paracladopelma cf. winnelli							20	20	0.4						
Robackia cf. demeijerei															
Saetheria cf. tylus	121	35	54.5	61	35	1.8	40	40	0.8	81	53	7.4	20	20	5.8
Polypedilum cf. scalaenum	20	20	9.0	323	88	9.4	1374	211	27.0	303	126	27.8	81	40	23.6
Polypedilum fallax-gr.													20	20	5.5
Polypedilum sp. 2															
Cladotanytarsus sp.				343	73	9.9	525	165	10.3	20	20	1.8			
Micropsectra sp.															
Tanytarsus sp.															
Psectrocladius sp.															
Cricotopus sp.															
Heterotrissocladius cf. changi							20	20	0.4				20	20	5.8
Hydrobaenus sp.															
Orthocladius (O.) sp. 1															
Orthocladius (O.) sp. 2															
Orthocladius (E.) sp.															
Parakiefferiella sp.							81	20	1.6						
Monodiamesa cf. tuberculata				20	20	0.6				20	20	1.8	20	20	5.5
Potthastia cf. longimanus															
Procladius sp.															
Others															

APPENDIX 7. Mean densities (number m^{-2}) of annelid taxa present at each station sampled in 1978 near J. H. Campbell Plant, eastern Lake Michigan. In addition to mean and standard error, naidid and tubificid taxa at each depth have been expressed as a percentage of total naidids and total tubificids, respectively. ($\bar{X}$ = mean, S.E. = standard error, n = 3).

MONTH: April TRANSECT: North 1

	3 meters			6 meters			9 meters			12 meters			15 meters		
Taxa	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%
Total Naididae							505	81		40	20		242	185	
Chaetogaster diaphanus															
Chaetogaster diastrophus															
Chaetogaster setosus															
Nais simplex															
Nais variabilis															
Paranais litoralis															
Paranais simplex															
Piguetiella michiganensis							505	81	100.0	40	20	100.0	222	165	91.7
Pristina foreli															
Pristina osborni															
Stylaria lacustris															
Uncinais uncinata													20	20	8.3
Vejdovskyella intermedia															
Amphichaeta leydigii															
Dero sp.															
Total Tubificidae							2121	667		202	173		2101	1034	
Limnodrilus hoffmeisteri							40	40	1.9				61	35	2.9
Limnodrilus angustipenis															
Limnodrilus profundicola							20	20	0.9						
Limnodrilus spiralis										20	20	9.9	61	61	2.9
Limnodrilus udekemianus															
Aulodrilus limnobius															
Peloscolex freyi															
Potamothrix moldaviensis							81	20	3.8				141	53	6.7
Potamothrix vejdovskyi													20	20	1.0
Immatures w/o hair chaetae							1980	630	93.4	182	152	90.1	1798	977	85.6
Immatures w/hair chaetae													20	20	1.0
Stylodrilus heringianus															
Enchytraeidae							20	20							
Hirudinea													40	20	

APPENDIX 7. Continued.

MONTH: April TRANSECT: South 1

Taxa	3 meters X̄	3 meters S.E.	3 meters %	6 meters X̄	6 meters S.E.	6 meters %	9 meters X̄	9 meters S.E.	9 meters %	12 meters X̄	12 meters S.E.	12 meters %	15 meters X̄	15 meters S.E.	15 meters %
Total Naididae	20	20					101	73		586	101		303	152	
Chaetogaster diaphanus															
Chaetogaster diastrophus															
Chaetogaster setosus															
Nais simplex	20	20	100.0												
Nais variabilis															
Paranais litoralis															
Paranais simplex															
Piguetiella michiganensis							81	54	80.2	545	61	93.0	303	152	100.0
Pristina foreli															
Pristina osborni															
Stylaria lacustris															
Uncinais uncinata							20	20	19.8	40	40	6.8			
Vejdovskyella intermedia															
Amphichaeta leydigii															
Dero sp.															
Total Tubificidae							101	101		1192	859		1374	417	
Limnodrilus hoffmeisteri															
Limnodrilus angustipenis							20	20	19.8						
Limnodrilus profundicola															
Limnodrilus spiralis													40	20	2.9
Limnodrilus udekemianus															
Aulodrilus limnobius															
Peloscolex freyi															
Potamothrix moldaviensis										40	40	3.4	40	40	2.9
Potamothrix vejdovskyi															
Immatures w/o hair chaetae							81	81	80.2	1151	818	96.6	1293	364	94.1
Immatures w/hair chaetae															
Stylodrilus heringianus															
Enchytraeidae															
Hirudinea															

APPENDIX 7. Continued.

MONTH: April TRANSECT: North 2

Taxa	3 meters			6 meters			9 meters			12 meters			15 meters		
	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Naididae				20	20		384	199		384	53		586	112	
Chaetogaster diaphanus															
Chaetogaster diastrophus															
Chaetogaster setosus															
Nais simplex															
Nais variabilis															
Paranais litoralis															
Paranais simplex															
Piguetiella michiganensis				20	20	100.0	384	199	100.0	384	53	100.0	586	112	100.0
Pristina foreli															
Pristina osborni															
Stylaria lacustris															
Uncinais uncinata															
Vejdovskyella intermedia															
Amphichaeta leydigii															
Dero sp.															
Total Tubificidae	20	20					1353	364		1212	424		2565	340	
Limnodrilus hoffmeisteri															
Limnodrilus angustipenis							20	20	1.5	20	20	1.7	40	40	1.6
Limnodrilus profundicola															
Limnodrilus spiralis							20	20	1.5				20	20	0.8
Limnodrilus udekemianus															
Aulodrilus limnobius															
Peloscolex freyi															
Potamothrix moldaviensis							40	20	3.0	40	20	3.3	101	20	3.9
Potamothrix vejdovskyi													61	35	2.4
Immatures w/o hair chaetae	20	20	100.0				1273	370	94.1	1151	412	95.0	2343	298	91.3
Immatures w/hair chaetae															
Stylodrilus heringianus															
Enchytraeidae										61	35		40	40	
Hirudinea													40	20	

APPENDIX 7. Continued.

MONTH: April TRANSECT: South 2

Taxa	3 meters			6 meters			9 meters			12 meters			15 meters		
	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Naididae							162	101		182	92		303	213	
Chaetogaster diaphanus															
Chaetogaster diastrophus															
Chaetogaster setosus															
Nais simplex															
Nais variabilis															
Paranais litoralis															
Paranais simplex															
Piguetiella michiganensis							141	112	87.0	182	92	100.0	303	213	100.0
Pristina foreli															
Pristina osborni															
Stylaria lacustris															
Uncinais uncinata							20	20	12.3						
Vejdovskyella intermedia															
Amphichaeta leydigii															
Dero sp.															
Total Tubificidae							505	351		2262	695		525	193	
Limnodrilus hoffmeisteri															
Limnodrilus angustipenis															
Limnodrilus profundicola															
Limnodrilus spiralis										81	140	3.6	20	20	3.8
Limnodrilus udekemianus															
Aulodrilus limnobius															
Peloscolex freyi															
Potamothrix moldaviensis							20	20	4.0	222	81	9.8	40	40	7.6
Potamothrix vejdovskyi															
Immatures w/o hair chaetae							485	365	96.0	1959	588	86.6	465	158	88.6
Immatures w/hair chaetae															
Stylodrilus heringianus															
Enchytraeidae															
Hirudinea															

APPENDIX 7. Continued.

MONTH: April TRANSECT: North 3

Taxa	3 meters X̄	3 meters S.E.	3 meters %	6 meters X̄	6 meters S.E.	6 meters %	9 meters X̄	9 meters S.E.	9 meters %	12 meters X̄	12 meters S.E.	12 meters %	15 meters X̄	15 meters S.E.	15 meters %
Total Naididae							222	73		1313	960		505	112	
Chaetogaster diaphanus															
Chaetogaster diastrophus															
Chaetogaster setosus															
Nais simplex															
Nais variabilis													20	20	4.0
Paranais litoralis										889	889	67.7			
Paranais simplex															
Piguetiella michiganensis							222	73	100.0	384	162	29.2	465	107	92.0
Pristina foreli															
Pristina osborni															
Stylaria lacustris															
Uncinais uncinata										40	20	3.0	20	20	4.0
Vejdovskyella intermedia															
Amphichaeta leydigii															
Dero sp.															
Total Tubificidae							1636	767		1050	612		3030	588	
Limnodrilus hoffmeisteri							40	20	2.4						
Limnodrilus angustipenis										20	20	1.9	40	40	1.3
Limnodrilus profundicola															
Limnodrilus spiralis										20	20	1.9	40	20	1.3
Limnodrilus udekemianus															
Aulodrilus limnobius															
Peloscolex freyi															
Potamothrix moldaviensis							20	20	1.2				162	53	5.3
Potamothrix vejdovskyi													101	53	3.3
Immatures w/o hair chaetae							1576	733	96.3	1010	577	96.2	2687	476	88.7
Immatures w/hair chaetae															
Stylodrilus heringianus															
Enchytraeidae							20	20							
Hirudinea													40	20	

APPENDIX 7. Continued.

MONTH: April TRANSECT: South 3

Taxa	3 meters $\overline{X}$	3 meters S.E.	3 meters %	6 meters $\overline{X}$	6 meters S.E.	6 meters %	9 meters $\overline{X}$	9 meters S.E.	9 meters %	12 meters $\overline{X}$	12 meters S.E.	12 meters %	15 meters $\overline{X}$	15 meters S.E.	15 meters %
Total Naididae							162	40		1071	199		20	20	
Chaetogaster diaphanus															
Chaetogaster diastrophus															
Chaetogaster setosus															
Nais simplex															
Nais variabilis															
Paranais litoralis															
Paranais simplex															
Piguetiella michiganensis							162	40	100.0	1071	199	100.0	20	20	100.0
Pristina foreli															
Pristina osborni															
Stylaria lacustris															
Uncinais uncinata															
Vejdovskyella intermedia															
Amphichaeta leydigii															
Dero sp.															
Total Tubificidae				121			1616	325		1555	385		182	182	
Limnodrilus hoffmeisteri															
Limnodrilus angustipenis							40	20	2.3	20	20	1.3			
Limnodrilus profundicola															
Limnodrilus spiralis							40	20	2.3	81	53	5.2			
Limnodrilus udekemianus															
Aulodrilus limnobius															
Peloscolex freyi															
Potamothrix moldaviensis							162	54	10.0	121	121	7.8			
Potamothrix vejdovskyi				20	20	16.5									
Immatures w/o hair chaetae				101	20	83.5	1374	350	85.0	1333	334	85.7			
Immatures w/hair chaetae													182	182	100.0
Stylodrilus heringianus															
Enchytraeidae										20	20				
Hirudinea															

APPENDIX 7. Continued.

MONTH: July TRANSECT: North 1

Taxa	3 meters $\overline{X}$	3 meters S.E.	3 meters %	6 meters $\overline{X}$	6 meters S.E.	6 meters %	9 meters $\overline{X}$	9 meters S.E.	9 meters %	12 meters $\overline{X}$	12 meters S.E.	12 meters %	15 meters $\overline{X}$	15 meters S.E.	15 meters %
Total Naididae	121	61		1980	886		2101	805		3212	543		687	354	
Chaetogaster diaphanus				808	516	40.8	444	225	21.1	485	160	15.1	121	61	17.6
Chaetogaster diastrophus															
Chaetogaster setosus															
Nais simplex															
Nais variabilis	40	40	33.1	101	53	5.1	20	20	1.0	20	20	0.6			
Paranais litoralis															
Paranais simplex							81	53	3.9	40	40	1.2	263	263	38.3
Piguetiella michiganensis				101	53	5.1	889	437	42.3	929	173	28.9	121		17.6
Pristina foreli															
Pristina osborni															
Stylaria lacustris				40	40	2.0	202	107	9.6	1353	534	42.1	101	20	14.7
Uncinais uncinata	81	53	66.9	929	336	46.9	343	53	16.3	162	40	5.0	20	20	2.9
Vejdovskyella intermedia							121	35	5.8	222	132	6.9	61	61	8.9
Amphichaeta leydigii															
Dero sp.															
Total Tubificidae				40	40		1919	795		747	298		101	40	
Limnodrilus hoffmeisteri							40	40	2.1	202	173	27.0			
Limnodrilus angustipenis							40	20	2.1				20	20	19.8
Limnodrilus profundicola										20	20	2.7			
Limnodrilus spiralis															
Limnodrilus udekemianus															
Aulodrilus limnobius															
Peloscolex freyi							20	20	1.0	20	20	2.7			
Potamothrix moldaviensis				20	20	50.0	101	40	5.3	121	92	16.2	20	20	19.8
Potamothrix vejdovskyi															
Immatures w/o hair chaetae				20	20	50.0	1717	480	89.5	384	107	51.4	61		60.4
Immatures w/hair chaetae															
Stylodrilus heringianus							20	20							
Enchytraeidae															
Hirudinea															

APPENDIX 7. Continued.

	MONTH: July								TRANSECT: South 1						
	3 meters			6 meters			9 meters			12 meters			15 meters		
Taxa	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Naididae	828	179		1717	491		3333	836		2424	1422		606	175	
Chaetogaster diaphanus	81	40	9.9	545	370	31.7	808	455	24.2	465	233	19.2			
Chaetogaster diastrophus															
Chaetogaster setosus															
Nais simplex															
Nais variabilis	61	61	7.4	40	20	2.3	20	20	0.6	20	20	0.8			
Paranais litoralis										20	20	0.8	20	20	3.3
Paranais simplex							20	20	0.6						
Piguetiella michiganensis	61	35	7.4	81	53	4.7	646	40	19.4	465	141	19.2	323	53	53.3
Pristina foreli															
Pristina osborni															
Stylaria lacustris	40	40	4.8	141	53	8.2	707	325	21.2	1313	1020	54.2	162	132	26.7
Uncinais uncinata	586	123	70.8	889	81	51.8	1010	267	30.3	20	20	0.8	61	40	10.1
Vejdovskyella intermedia				20	20	1.2	20	20	0.6	121	70	5.0	40	20	6.6
Amphichaeta leydigii							101	101	3.0						
Dero sp.															
Total Tubificidae							1414	123		101	20		384	132	
Limnodrilus hoffmeisteri										40	20	39.6	20	20	5.2
Limnodrilus angustipenis							40	20	2.8						
Limnodrilus profundicola															
Limnodrilus spiralis															
Limnodrilus udekemianus															
Aulodrilus limnobius															
Peloscolex freyi															
Potamothrix moldaviensis							162	53	11.5						
Potamothrix vejdovskyi													20	20	5.2
Immatures w/o hair chaetae							1212	160	85.7	61		60.4	343	112	89.3
Immatures w/hair chaetae															
Stylodrilus heringianus							101	101					121	70	
Enchytraeidae															
Hirudinea													20	20	

APPENDIX 7. Continued.

MONTH: July TRANSECT: North 2

Taxa	3 meters $\overline{X}$	3 meters S.E.	3 meters %	6 meters $\overline{X}$	6 meters S.E.	6 meters %	9 meters $\overline{X}$	9 meters S.E.	9 meters %	12 meters $\overline{X}$	12 meters S.E.	12 meters %	15 meters $\overline{X}$	15 meters S.E.	15 meters %
Total Naididae				1737	165		2767	843		3030	1303		1838	919	
Chaetogaster diaphanus				384	176	22.1	1293	700	46.7	343	49	11.3	222	40	12.1
Chaetogaster diastrophus															
Chaetogaster setosus															
Nais simplex															
Nais variabilis				61	35	3.5	20	20	0.7	20	20	0.7	61		3.3
Paranais litoralis							20	20	0.7				20	20	1.1
Paranais simplex										40	20	1.3			
Piguetiella michiganensis				101	20	5.8	505	193	18.3	1010	530	33.3	707	647	38.5
Pristina foreli															
Pristina osborni															
Stylaria lacustris				162	88	9.3	465	302	16.8	1273	689	42.0	343	40	18.7
Uncinais uncinata				1030	245	59.3	404	53	14.6	202	20	6.7	283	145	15.4
Vejdovskyella intermedia							61	35	2.2	141	53	4.7	202	173	11.0
Amphichaeta leydigii															
Dero sp.															
Total Tubificidae				303	160		1293	618		1050	398		2060	1823	
Limnodrilus hoffmeisteri							40	40	3.1	81	20	7.7	121	121	5.9
Limnodrilus angustipenis				20	20	6.6	40	20	3.1	61	35	5.8			
Limnodrilus profundicola				40	40	13.2	20	20	1.5	101	20	9.6	20	20	1.0
Limnodrilus spiralis															
Limnodrilus udekemianus															
Aulodrilus limnobius															
Peloscolex freyi										40	40	3.8			
Potamothrix moldaviensis							222	123	17.2	40	20	3.8	202	123	9.8
Potamothrix vejdovskyi													182	182	8.8
Immatures w/o hair chaetae				242	121	79.9	970	455	75.0	727	345	69.2	1353	1323	65.7
Immatures w/hair chaetae													182	182	8.8
Stylodrilus heringianus										20	20		1616	763	
Enchytraeidae															
Hirudinea													20	20	

APPENDIX 7. Continued.

MONTH: July TRANSECT: South 2

Taxa	3 meters			6 meters			9 meters			12 meters			15 meters		
	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%
Total Naididae				667	218		5151	1490		5193	1197		1252	577	
Chaetogaster diaphanus				81	40	12.1	2464	945	47.8	1414	285	27.2	121	121	9.7
Chaetogaster diastrophus															
Chaetogaster setosus															
Nais simplex															
Nais variabilis				20	35	3.0							20	20	1.6
Paranais litoralis															
Paranais simplex							40	40	0.8	61	40	1.2			
Piguetiella michiganensis				101	73	15.1	808	205	15.7	1172	315	22.6	182	92	14.5
Pristina foreli															
Pristina osborni															
Stylaria lacustris							889	298	17.3	2323	495	44.8	667	365	53.3
Uncinais uncinata				465	101	69.7	586	101	11.4	61	40	1.2	162	53	12.9
Vejdovskyella intermedia							364	160	7.1	162	81	3.1	101	73	8.1
Amphichaeta leydigii															
Dero sp.															
Total Tubificidae	20	20					1959	437		1454	365		141	112	
Limnodrilus hoffmeisteri							40	40	2.0	40	20	2.8			
Limnodrilus angustipenis							40	20	2.0	61		4.2			
Limnodrilus profundicola															
Limnodrilus spiralis										20	20	1.4			
Limnodrilus udekemianus															
Aulodrilus limnobius															
Peloscolex freyi							81	53	4.1	20	20	1.4			
Potamothrix moldaviensis							283	73	14.4	101	73	6.9			
Potamothrix vejdovskyi															
Immatures w/o hair chaetae	20	20	100.0				1515	420	77.3	1212	311	83.4	141	112	100.0
Immatures w/hair chaetae															
Stylodrilus heringianus													141	141	
Enchytraeidae															
Hirudinea															

APPENDIX 7. Continued.

MONTH: July   TRANSECT: North 3

Taxa	3 meters X̄	S.E.	%	6 meters X̄	S.E.	%	9 meters X̄	S.E.	%	12 meters X̄	S.E.	%	15 meters X̄	S.E.	%
Total Naididae				1071	141		4484	494		6100	2315		687	107	
Chaetogaster diaphanus				424	35	39.6	1414	592	31.5	2141	742	35.1	81	40	11.8
Chaetogaster diastrophus															
Chaetogaster setosus															
Nais simplex															
Nais variabilis							40	40	0.9						
Paranais litoralis															
Paranais simplex										40	20	0.7			
Piguetiella michiganensis				20	20	1.9	1313	466	29.3	1515	573	24.8	242	35	35.2
Pristina foreli															
Pristina osborni															
Stylaria lacustris				81	40	7.6	727	447	16.2	1919	1349	31.5	20	20	2.9
Uncinais uncinata				545	105	50.9	889	253	19.8	263	133	4.3	283	88	41.2
Vejdovskyella intermedia							101	40	2.3	222	88	3.6	61	35	8.9
Amphichaeta leydigii															
Dero sp.															
Total Tubificidae				61	61		1353	496		2020	874		1535	476	
Limnodrilus hoffmeisteri										81	53	4.0	121	92	7.9
Limnodrilus angustipenis							20	20	1.5	101	73	5.0			
Limnodrilus profundicola										81	40	4.0			
Limnodrilus spiralis															
Limnodrilus udekemianus															
Aulodrilus limnobius															
Peloscolex freyi							61	35	4.5	20	20	1.0			
Potamothrix moldaviensis							101	73	7.5	283	88	14.0	162	73	10.6
Potamothrix vejdovskyi													61	35	4.0
Immatures w/o hair chaetae				61	61	100.0	1172	427	86.6	1454	683	72.0	1172	336	76.4
Immatures w/hair chaetae													20	20	1.3
Stylodrilus heringianus							20	20		222	193		2565	1195	
Enchytraeidae															
Hirudinea													121	70	

APPENDIX 7. Continued.

MONTH: July TRANSECT: South 3

Taxa	3 meters $\bar{X}$	3 meters S.E.	3 meters %	6 meters $\bar{X}$	6 meters S.E.	6 meters %	9 meters $\bar{X}$	9 meters S.E.	9 meters %	12 meters $\bar{X}$	12 meters S.E.	12 meters %	15 meters $\bar{X}$	15 meters S.E.	15 meters %
Total Naididae				2262	432		3717	747		4404	2099		788	152	
Chaetogaster diaphanus				909	299	40.2	1838	432	49.4	889	352	20.2	81	53	10.3
Chaetogaster diastrophus															
Chaetogaster setosus															
Nais simplex															
Nais variabilis				40	20	1.8	20	20	0.5				20	20	2.5
Paranais litoralis				40	20	1.8							20	20	2.5
Paranais simplex				20	20	0.9				61	35	1.4			
Piguetiella michiganensis				242	35	10.7	626	325	16.8	1151	430	26.1	444	146	56.3
Pristina foreli															
Pristina osborni															
Stylaria lacustris				81	81	3.6	949	298	25.5	2101	1443	47.7	162	107	20.6
Uncinais uncinata				929	214	41.1	263	101	7.1	162	40	3.7	20	20	2.5
Vejdovskyella intermedia							20	20	0.5	40	40	0.9	40	40	5.1
Amphichaeta leydigii															
Dero sp.															
Total Tubificidae				1313	350		1091	727		424	195		40	40	
Limnodrilus hoffmeisteri										81	53	19.1			
Limnodrilus angustipenis				20	20	1.5									
Limnodrilus profundicola															
Limnodrilus spiralis															
Limnodrilus udekemianus															
Aulodrilus limnobius															
Peloscolex freyi				81	40	6.2	61	35	5.6	40	40	9.4			
Potamothrix moldaviensis							263	233	24.1						
Potamothrix vejdovskyi															
Immatures w/o hair chaetae				1212	299	92.3	768	526	70.4	303	152	71.5	40	40	100.0
Immatures w/hair chaetae															
Stylodrilus heringianus										20	20		20	20	
Enchytraeidae															
Hirudinea													20	20	

APPENDIX 7. Continued.

MONTH: October TRANSECT: North 1

Taxa	3 meters			6 meters			9 meters			12 meters			15 meters		
	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Naididae				141	53		2384	205		1131	107		889	158	
Chaetogaster diaphanus															
Chaetogaster diastrophus															
Chaetogaster setosus															
Nais simplex													20	20	2.2
Nais variabilis															
Paranais litoralis															
Paranais simplex										40	20	3.5			
Piguetiella michiganensis				121	70	85.8	2262	205	94.9	990	158	87.5	586	20	65.9
Pristina foreli															
Pristina osborni															
Stylaria lacustris															
Uncinais uncinata				20	20	14.2	121		5.1						
Vejdovskyella intermedia										101	101	8.9	263	179	29.6
Amphichaeta leydigii													20	20	2.2
Dero sp.															
Total Tubificidae				61	35		1091	245		2767	776		3272	1382	
Limnodrilus hoffmeisteri															
Limnodrilus angustipenis															
Limnodrilus profundicola															
Limnodrilus spiralis															
Limnodrilus udekemianus															
Aulodrilus limnobius															
Peloscolex freyi															
Potamothrix moldaviensis													101	53	3.1
Potamothrix vejdovskyi										40	20	1.4	81	40	2.5
Immatures w/o hair chaetae				61	35	100.0	1091	245	100.0	2727	757	98.6	3091	1350	94.5
Immatures w/hair chaetae															
Stylodrilus heringianus													1959	595	
Enchytraeidae							20	20		626	176		707	331	
Hirudinea															

APPENDIX 7. Continued.

MONTH: October TRANSECT: South 1

Taxa	3 meters			6 meters			9 meters			12 meters			15 meters		
	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Naididae				40	40		1677	478		1353	461		1010	317	
Chaetogaster diaphanus													40	20	4.0
Chaetogaster diastrophus															
Chaetogaster setosus															
Nais simplex															
Nais variabilis															
Paranais litoralis															
Paranais simplex										40	20	3.0			
Piguetiella michiganensis				20	20	50.0	1616	443	96.4	1293	417	95.6	848	299	84.0
Pristina foreli				20	20	50.0							20	20	2.0
Pristina osborni															
Stylaria lacustris															
Uncinais uncinata							61	35	3.6	20	20	1.5			
Vejdovskyella intermedia													81	53	8.0
Amphichaeta leydigii															
Dero sp.													20	20	2.0
Total Tubificidae							1434	538		1313	600		646	359	
Limnodrilus hoffmeisteri															
Limnodrilus angustipenis															
Limnodrilus profundicola															
Limnodrilus spiralis															
Limnodrilus udekemianus															
Aulodrilus limnobius															
Peloscolex freyi															
Potamothrix moldaviensis															
Potamothrix vejdovskyi															
Immatures w/o hair chaetae							1434	538	100.0	1293	603	98.5	646	359	100.0
Immatures w/hair chaetae										20	20	1.5			
Stylodrilus heringianus							40	20		20	20		81	20	
Enchytraeidae										242	213		162	40	
Hirudinea															

APPENDIX 7. Continued.

MONTH: October TRANSECT: North 2

Taxa	3 meters			6 meters			9 meters			12 meters			15 meters		
	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Naididae				263	233		1899	53		1131	214		1292	515	
Chaetogaster diaphanus															
Chaetogaster diastrophus															
Chaetogaster setosus															
Nais simplex															
Nais variabilis															
Paranais litoralis															
Paranais simplex															
Piguetiella michiganensis				162	132	61.6	1858	73	97.8	1071	228	94.7	1050	491	81.3
Pristina foreli				40	40	15.2				20	20	1.8			
Pristina osborni				61	61	23.2									
Stylaria lacustris															
Uncinais uncinata							40	20	2.1	20	20	1.8	20	20	1.5
Vejdovskyella intermedia										20	20	1.8	182	35	14.1
Amphichaeta leydigii															
Dero sp.													40	40	3.1
Total Tubificidae				101	73		909	218		1778	940		4909	1537	
Limnodrilus hoffmeisteri															
Limnodrilus angustipenis															
Limnodrilus profundicola															
Limnodrilus spiralis															
Limnodrilus udekemianus															
Aulodrilus limnobius															
Peloscolex freyi															
Potamothrix moldaviensis													121	35	2.5
Potamothrix vejdovskyi													323	107	6.6
Immatures w/o hair chaetae				101	73	100.0	909	218	100.0	1778	940	100.0	4302	1581	87.6
Immatures w/hair chaetae													162	20	3.3
Stylodrilus heringianus													4666	2292	
Enchytraeidae										121	121		1232	455	
Hirudinea															

APPENDIX 7. Continued.

MONTH: October TRANSECT: South 2

Taxa	3 meters $\overline{X}$	3 meters S.E.	3 meters %	6 meters $\overline{X}$	6 meters S.E.	6 meters %	9 meters $\overline{X}$	9 meters S.E.	9 meters %	12 meters $\overline{X}$	12 meters S.E.	12 meters %	15 meters $\overline{X}$	15 meters S.E.	15 meters %
Total Naididae				202	141		1798	283		667	337		1010	377	
Chaetogaster diaphanus															
Chaetogaster diastrophus															
Chaetogaster setosus															
Nais simplex															
Nais variabilis															
Paranais litoralis															
Paranais simplex															
Piguetiella michiganensis				141	112	69.8	1737	285	96.6	646	345	96.8	404	205	40.0
Pristina foreli				20	20	9.9									
Pristina osborni															
Stylaria lacustris															
Uncinais uncinata				40	40	19.8	61	35	3.4				586	586	58.0
Vejdovskyella intermedia										20	20	3.0			
Amphichaeta leydigii															
Dero sp.													20	20	2.0
Total Tubificidae							1555	374		1899	1081		505	132	
Limnodrilus hoffmeisteri															
Limnodrilus angustipenis															
Limnodrilus profundicola															
Limnodrilus spiralis															
Limnodrilus udekemianus															
Aulodrilus limnobius															
Peloscolex freyi															
Potamothrix moldaviensis															
Potamothrix vejdovskyi															
Immatures w/o hair chaetae							1555	374	100.0	1899	1081	100.0	505	132	100.0
Immatures w/hair chaetae															
Stylodrilus heringianus													40	40	
Enchytraeidae													121	61	
Hirudinea															

APPENDIX 7. Continued.

MONTH: October TRANSECT: North 3

Taxa	3 meters X̄	S.E.	%	6 meters X̄	S.E.	%	9 meters X̄	S.E.	%	12 meters X̄	S.E.	%	15 meters X̄	S.E.	%
Total Naididae				364	126		2101	660		2505	336		1576	334	
Chaetogaster diaphanus													40	20	2.5
Chaetogaster diastrophus															
Chaetogaster setosus										40	20	1.6			
Nais simplex															
Nais variabilis															
Paranais litoralis															
Paranais simplex															
Piguetiella michiganensis				343	123	94.2	1838	566	87.5	2403	332	95.9	1333	305	84.6
Pristina foreli													20	20	1.3
Pristina osborni															
Stylaria lacustris															
Uncinais uncinata				20	20	5.5	162	73	7.7	40	20	1.6			
Vejdovskyella intermedia													162	20	10.3
Amphichaeta leydigii							101	73	4.8	20	20	0.8	20	20	1.3
Dero sp.															
Total Tubificidae				20	20		1616	420		3333	252		3111	476	
Limnodrilus hoffmeisteri															
Limnodrilus angustipenis															
Limnodrilus profundicola															
Limnodrilus spiralis															
Limnodrilus udekemianus													20	20	0.6
Aulodrilus limnobius													20	20	0.6
Peloscolex freyi															
Potamothrix moldaviensis															
Potamothrix vejdovskyi													263	132	8.5
Immatures w/o hair chaetae				20	20	100.0	1616	420	100.0	3333	252	100.0	2767	547	88.9
Immatures w/hair chaetae													40	20	1.3
Stylodrilus heringianus							20	20	0.2	20	20	0.2	2182	175	14.8
Enchytraeidae							222	88		364	93		1535	73	
Hirudinea													20	20	

APPENDIX 7. Continued.

MONTH: October TRANSECT: South 3

Taxa	3 meters $\overline{X}$	3 meters S.E.	3 meters %	6 meters $\overline{X}$	6 meters S.E.	6 meters %	9 meters $\overline{X}$	9 meters S.E.	9 meters %	12 meters $\overline{X}$	12 meters S.E.	12 meters %	15 meters $\overline{X}$	15 meters S.E.	15 meters %
Total Naididae	61			1939	648		3070	317		848	153		1353	331	
Chaetogaster diaphanus													20	20	1.5
Chaetogaster diastrophus	20	20	33.3	202	113	10.4	101	53	3.3						
Chaetogaster setosus															
Nais simplex															
Nais variabilis													20	20	1.5
Paranais litoralis															
Paranais simplex															
Piguetiella michiganensis	20	20	33.3	1475	419	76.1	2747	359	89.5	848	142	100.0	1313	325	97.0
Pristina foreli															
Pristina osborni							20	20	0.7						
Stylaria lacustris															
Uncinais uncinata				202	88	10.4	162	40	5.3						
Vejdovskyella intermedia							40	40	1.3						
Amphichaeta leydigii	20	20	33.3	61	61	3.1									
Dero sp.															
Total Tubificidae				465	107		1555	225		1697	723		303	140	
Limnodrilus hoffmeisteri															
Limnodrilus angustipenis															
Limnodrilus profundicola															
Limnodrilus spiralis															
Limnodrilus udekemianus															
Aulodrilus limnobius															
Peloscolex freyi															
Potamothrix moldaviensis							61	35	3.9						
Potamothrix vejdovskyi															
Immatures w/o hair chaetae				465	107	100.0	1495	193	96.1	1697	723	100.0	303	140	100.0
Immatures w/hair chaetae															
Stylodrilus heringianus															
Enchytraeidae							61			81	53		20	20	
Hirudinea															

APPENDIX 8. Mean densities (number m^{-2}) of gastropod and pelecypod taxa present at each station sampled in 1978 near J. H. Campbell Plant, eastern Lake Michigan. In addition to mean and standard error, the taxa beneath total Gastropoda, total Pisidium and total Sphaerium at each depth have been expressed as a percentage of their respective summed totals. ($\overline{X}$ = mean, S.E. = standard error, n = 3).

MONTH: April TRANSECT: North 1

Taxa	3 meters			6 meters			9 meters			12 meters			15 meters		
	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Gastropoda							40	20		20	20		222	107	
Valvata sincera															
Valvata sp.							40	20	100.0	20	20	100.0	182	92	82.0
Amnicola sp.													40	20	18.0
Bythinia tentaculata															
Lymnaea sp.															
Total Pelecypoda							202	123		20	20		808	165	
Total Pisidium							202	123		20	20		808	165	
Pisidium adamsi															
Pisidium casertanum							101	73	50.0				81	20	10.0
Pisidium compressum															
Pisidium conventus													121		15.0
Pisidium fallax										20	20	100.0	81	20	10.0
Pisidium henslowanum													20	20	2.5
Pisidium lilljeborgi															
Pisidium nitidum f. nitidum							20	20	9.9				364	126	45.0
Pisidium nitidum f. pauperculum							20	20	9.9						
Pisidium supinum															
Pisidium variabile													81	53	10.0
Pisidium walkeri															
Pisidium spp.							61	61	30.2				61		7.5
Total Sphaerium															
Sphaerium nitidum															
Sphaerium striatinum															
Sphaerium transversum															

APPENDIX 8. Continued.

MONTH: April TRANSECT: South 1

Taxa	3 meters			6 meters			9 meters			12 meters			15 meters		
	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%
Total Gastropoda							40	40		81	53		40	20	
Valvata sincera															
Valvata sp.							40	40	100.C	81	53	100.0			
Amnicola sp.													40	20	100.0
Bythinia tentaculata															
Lymnaea sp.															
Total Pelecypoda							61	35		424	160		828	88	
Total *Pisidium*							61	35		424	160		828	88	
Pisidium adamsi															
Pisidium casertanum										40	40	9.4	222	73	26.8
Pisidium compressum													81	20	9.8
Pisidium conventus										40	20	9.4	61	35	7.4
Pisidium fallax										40	20	9.4	20	20	2.4
Pisidium henslowanum										20	20	4.7			
Pisidium lilljeborgi															
Pisidium nitidum f. *nitidum*							61	35	100.0	242	140	57.1	343	53	41.4
Pisidium nitidum f. *pauperculum*															
Pisidium supinum															
Pisidium variabile										20	20	4.7			
Pisidium walkeri															
Pisidium spp.										20	20	4.7	101	40	12.2
Total *Sphaerium*															
Sphaerium nitidum															
Sphaerium striatinum															
Sphaerium transversum															

APPENDIX 8. Continued.

MONTH: April TRANSECT: North 2

Taxa	3 meters $\bar{X}$	3 meters S.E.	3 meters %	6 meters $\bar{X}$	6 meters S.E.	6 meters %	9 meters $\bar{X}$	9 meters S.E.	9 meters %	12 meters $\bar{X}$	12 meters S.E.	12 meters %	15 meters $\bar{X}$	15 meters S.E.	15 meters %
Total Gastropoda										101	20		162	40	
Valvata sincera															
Valvata sp.										81	20	80.2	121		74.7
Amnicola sp.										20	20	19.8	40	40	24.7
Bythinia tentaculata															
Lymnaea sp.															
Total Pelecypoda				20	20		182	50		364	126		1010	281	
Total _Pisidium_				20	20		162	38		343	146		1010	281	
Pisidium adamsi															
Pisidium casertanum							20	20	12.3	162	81	47.2	323	112	32.0
Pisidium compressum															
Pisidium conventus							20	20	12.3	61	35	17.8	121	61	12.0
Pisidium fallax										40	20	11.7	40	20	4.0
Pisidium henslowanum													40	40	4.0
Pisidium lilljeborgi															
Pisidium nitidum f. _nitidum_							121	25	74.7	40	20	11.7	283	107	28.0
Pisidium nitidum f. _pauperculum_															
Pisidium supinum															
Pisidium variabile										20	20	5.8	20	20	2.0
Pisidium walkeri															
Pisidium spp.				20	20	100.0				20	20	5.8	182	61	18.0
Total _Sphaerium_							20	20		20	20				
Sphaerium nitidum															
Sphaerium striatinum							20	20	100.0	20	20	100.0			
Sphaerium transversum															

APPENDIX 8. Continued.

MONTH: April TRANSECT: South 2

Taxa	3 meters $\bar{X}$	3 meters S.E.	3 meters %	6 meters $\bar{X}$	6 meters S.E.	6 meters %	9 meters $\bar{X}$	9 meters S.E.	9 meters %	12 meters $\bar{X}$	12 meters S.E.	12 meters %	15 meters $\bar{X}$	15 meters S.E.	15 meters %
Total Gastropoda										61	35				
Valvata sincera															
Valvata sp.										40	40	66.2			
Amnicola sp.															
Bythinia tentaculata															
Lymnaea sp.										20	20	33.1			
Total Pelecypoda							61	61		202	112		101	73	
Total *Pisidium*							61	61		202	112		101	73	
Pisidium adamsi															
Pisidium casertanum							40	40	66.2	81	40	40.1	20	20	19.8
Pisidium compressum															
Pisidium conventus															
Pisidium fallax															
Pisidium henslowanum										20	20	9.9			
Pisidium lilljeborgi															
Pisidium nitidum f. *nitidum*							20	20	33.1	101	73	50.0	20	20	19.8
Pisidium nitidum f. *pauperculum*															
Pisidium supinum															
Pisidium variabile															
Pisidium walkeri															
Pisidium spp.													61	35	60.4
Total *Sphaerium*															
Sphaerium nitidum															
Sphaerium striatinum															
Sphaerium transversum															

APPENDIX 8. Continued.

MONTH: April TRANSECT: North 3

Taxa	3 meters $\overline{X}$	3 meters S.E.	3 meters %	6 meters $\overline{X}$	6 meters S.E.	6 meters %	9 meters $\overline{X}$	9 meters S.E.	9 meters %	12 meters $\overline{X}$	12 meters S.E.	12 meters %	15 meters $\overline{X}$	15 meters S.E.	15 meters %
Total Gastropoda							40	20		222	53		283	81	
Valvata sincera															
Valvata sp.							40	20	100.0	202	40	91.0	182	35	64.3
Amnicola sp.													81	40	28.6
Bythinia tentaculata															
Lymnaea sp.										20	20	9.0	20	20	7.1
Total Pelecypoda							182	35		444	73		1333	321	
Total _Pisidium_							182	35		444	73		1252	332	
Pisidium adamsi															
Pisidium casertanum							61	35	33.5	121	61	27.3	566	141	45.2
Pisidium compressum															
Pisidium conventus							61	61	33.5				101	53	8.1
Pisidium fallax										40	20	9.0	141	20	11.3
Pisidium henslowanum															
Pisidium lilljeborgi															
Pisidium nitidum f. _nitidum_							40	20	22.0	222	53	50.0	384	145	30.7
Pisidium nitidum f. _pauperculum_															
Pisidium supinum															
Pisidium variabile															
Pisidium walkeri															
Pisidium spp.							20	20	11.0	61	35	13.7	61		4.9
Total _Sphaerium_													81	53	
Sphaerium nitidum															
Sphaerium striatinum													81	53	100.0
Sphaerium transversum															

APPENDIX 8. Continued.

	MONTH: April						TRANSECT: South 3								
	3 meters			6 meters			9 meters			12 meters			15 meters		
Taxa	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Gastropoda										182	92				
Valvata sincera															
Valvata sp.										81	40	44.5			
Amnicola sp.										101	53	55.5			
Bythinia tentaculata															
Lymnaea sp.															
Total Pelecypoda							61	35		303	35		40	20	
Total *Pisidium*							61	35		303	35		40	20	
Pisidium adamsi															
Pisidium casertanum							20	20	32.8	202	53	66.7			
Pisidium compressum															
Pisidium conventus										40	20	13.2	20	20	50.0
Pisidium fallax															
Pisidium henslowanum							20	20	32.8						
Pisidium lilljeborgi															
Pisidium nitidum f. *nitidum*										40	20	13.2	20	20	50.0
Pisidium nitidum f. *pauperculum*															
Pisidium supinum															
Pisidium variabile															
Pisidium walkeri															
Pisidium spp.							20	20	32.8	20	20	6.6			
Total *Sphaerium*															
Sphaerium nitidum															
Sphaerium striatinum															
Sphaerium transversum															

APPENDIX 8. Continued.

MONTH: July TRANSECT: North 1

Taxa	3 meters $\overline{X}$	3 meters S.E.	3 meters %	6 meters $\overline{X}$	6 meters S.E.	6 meters %	9 meters $\overline{X}$	9 meters S.E.	9 meters %	12 meters $\overline{X}$	12 meters S.E.	12 meters %	15 meters $\overline{X}$	15 meters S.E.	15 meters %
Total Gastropoda							20	14		242	70		162	101	
Valvata sincera							20	20	100.0	141	81	58.3	101	40	62.3
Valvata sp.															
Amnicola sp.										101	40	41.7	61	61	37.7
Bythinia tentaculata															
Lymnaea sp.															
Total Pelecypoda							81	20		364	61		263	88	
Total *Pisidium*							81	20		364	61		263	88	
Pisidium adamsi															
Pisidium casertanum							61		75.3	81	81	22.3	20	20	7.6
Pisidium compressum															
Pisidium conventus															
Pisidium fallax										40	20	11.0	61	61	23.2
Pisidium henslowanum										61	35	16.8	20	20	7.6
Pisidium lilljeborgi															
Pisidium nitidum f. *nitidum*										20	20	5.5	81	40	30.8
Pisidium nitidum f. *pauperculum*										20	20	5.5			
Pisidium supinum															
Pisidium variabile										40	40	11.0	61	35	23.2
Pisidium walkeri										61	61	16.8			
Pisidium spp.							20	20	24.7	40	20	11.0	20	20	7.6
Total *Sphaerium*															
Sphaerium nitidum															
Sphaerium striatinum															
Sphaerium transversum															

APPENDIX 8. Continued.

MONTH: July TRANSECT: South 1

Taxa	3 meters			6 meters			9 meters			12 meters			15 meters		
	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%	$\bar{X}$	S.E.	%
Total Gastropoda							61	35					303	126	
Valvata sincera															
Valvata sp.							20	20	32.8				182	70	60.1
Amnicola sp.													121	61	39.9
Bythinia tentaculata															
Lymnaea sp.							40	40	65.6						
Total Pelecypoda				40	20		101	20		61	35		808	323	
Total *Pisidium*				40	20		81	20		61	35		808	323	
Pisidium adamsi															
Pisidium casertanum				20	20	50.0				61	35	100.0	141	73	17.5
Pisidium compressum							61	35	75.3				61	61	7.5
Pisidium conventus															
Pisidium fallax													182	105	22.5
Pisidium henslowanum													81	40	10.0
Pisidium lilljeborgi															
Pisidium nitidum f. *nitidum*							20	20	24.7				101	73	12.5
Pisidium nitidum f. *pauperculum*				20	20	50.0							40	40	5.0
Pisidium supinum															
Pisidium variabile													101	75	12.5
Pisidium walkeri															
Pisidium spp.													101	53	12.5
Total *Sphaerium*							20	20							
Sphaerium nitidum															
Sphaerium striatinum							20	20	100.0						
Sphaerium transversum															

APPENDIX 8. Continued.

MONTH: July TRANSECT: North 2

Taxa	3 meters			6 meters			9 meters			12 meters			15 meters		
	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Gastropoda				40	40		20	20		121	61		424	229	
Valvata sincera				20	20	50.0				81	53	66.9	323	165	76.2
Valvata sp.															
Amnicola sp.				20	20	50.0	20	20	100.0	40	20	33.1	101	73	23.8
Bythinia tentaculata															
Lymnaea sp.															
Total Pelecypoda				61	35		202	53		404	40		2505	1418	
Total *Pisidium*				61	35		202	53		404	40		2505	1418	
Pisidium adamsi															
Pisidium casertanum				40	40	65.6	121	70	59.9	162	107	40.1	444	357	17.7
Pisidium compressum							20	20	9.9				40	40	1.6
Pisidium conventus										20	20	5.0	61	61	2.4
Pisidium fallax							20	20	9.9	101	53	25.0	343	180	13.7
Pisidium henslowanum										20	20	5.0	303	160	12.1
Pisidium lilljeborgi													61	61	2.4
Pisidium nitidum f. *nitidum*										20	20	5.0	727	420	29.0
Pisidium nitidum f. *pauperculum*										61	35	15.1	81	40	3.2
Pisidium supinum													20	20	0.8
Pisidium variabile										20	20	5.0	162	88	6.5
Pisidium walkeri															
Pisidium spp.				20	20	32.8	40	20	19.8				263	158	10.5
Total *Sphaerium*															
Sphaerium nitidum															
Sphaerium striatinum															
Sphaerium transversum															

APPENDIX 8. Continued.

MONTH: July TRANSECT: South 2

Taxa	3 meters			6 meters			9 meters			12 meters			15 meters		
	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Gastropoda							40	40		162	73		182	92	
Valvata sincera										81	20	50.0	162	73	89.0
Valvata sp.							40	40	100.0						
Amnicola sp.										61	35	37.7	20	20	11.0
Bythinia tentaculata															
Lymnaea sp.										20	20	12.3			
Total Pelecypoda							162	101		545	70		303	92	
Total *Pisidium*							162	101		525	88		303	92	
Pisidium adamsi															
Pisidium casertanum							40	20	24.7	202	40	38.5	20	20	6.6
Pisidium compressum															
Pisidium conventus															
Pisidium fallax							61	61	37.7	81	40	15.4	81	53	26.7
Pisidium henslowanum										20	20	3.8	40	20	13.2
Pisidium lilljeborgi															
Pisidium nitidum f. *nitidum*							20	20	12.3	61	35	11.6	101	40	33.3
Pisidium nitidum f. *pauperculum*										40	40	7.6			
Pisidium supinum										20	20	3.8			
Pisidium variabile							40	20	24.7	20	20	3.8	40	20	13.2
Pisidium walkeri															
Pisidium spp.										81	81	15.4	20	20	6.6
Total *Sphaerium*										20	20				
Sphaerium *nitidum*															
Sphaerium striatinum															
Sphaerium transversum										20	20	100.0			

APPENDIX 8. Continued.

MONTH: July TRANSECT: North 3

Taxa	3 meters			6 meters			9 meters			12 meters			15 meters		
	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Gastropoda							40	20		303	105		707	132	
Valvata sincera							20	20	50.0	263	112	86.8	444	88	62.8
Valvata sp.															
Amnicola sp.							20	20	50.0	40	40	13.2	263	73	37.2
Bythinia tentaculata															
Lymnaea sp.															
Total Pelecypoda				40	40		202	81		484	160		3293	1073	
Total *Pisidium*				40	40		202	81		444	123		3212	1009	
Pisidium adamsi															
Pisidium casertanum							182	93	90.1	141	40	31.8	505	140	15.7
Pisidium compressum										121	121	27.3	20	20	0.6
Pisidium conventus										20	20	4.5	303	61	9.4
Pisidium fallax							20	20	9.9	40	20	9.0	323	107	10.1
Pisidium henslowanum										20	20	4.5	323	176	10.1
Pisidium lilljeborgi															
Pisidium nitidum f. *nitidum*				20	20	50.0				20	20	4.5	1091	515	34.0
Pisidium nitidum f. *pauperculum*										20	20	4.5			
Pisidium supinum															
Pisidium variabile										40	20	9.0	364	93	11.3
Pisidium walkeri															
Pisidium spp.				20	20	50.0				20	20	4.5	283	73	8.8
Total *Sphaerium*										40	40		81	81	
Sphaerium nitidum													40	40	50.0
Sphaerium striatinum										40	40	100.0	40	40	50.0
Sphaerium transversum															

APPENDIX 8. Continued.

MONTH: July TRANSECT: South 3

Taxa	3 meters			6 meters			9 meters			12 meters			15 meters		
	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Gastropoda				20	20		61	35		20	20		20	20	
Valvata sincera							40	20	65.6				20	20	100.0
Valvata sp.							20	20	32.8						
Amnicola sp.				20	20	100.0				20	20	100.0			
Bythinia tentaculata															
Lymnaea sp.															
Total Pelecypoda				61	35		222	53		121	92		121	61	
Total *Pisidium*				61	35		222	53		101	73		121	61	
Pisidium adamsi															
Pisidium casertanum				40	20	65.6	40	40	18.0	40	40	39.6			
Pisidium compressum															
Pisidium conventus															
Pisidium fallax							61	35	27.5	20	20	19.8	20	20	16.5
Pisidium henslowanum													20	20	16.5
Pisidium lilljeborgi															
Pisidium nitidum f. *nitidum*										20	20	19.8	81	40	66.9
Pisidium nitidum f. *pauperculum*							20	20	9.0						
Pisidium supinum															
Pisidium variabile							40	40	18.0	20	20	19.8			
Pisidium walkeri															
Pisidium spp.				20	20	32.8	61	35	27.5						
Total *Sphaerium*										20	20				
Sphaerium nitidum															
Sphaerium striatinum										20	20	100.0			
Sphaerium transversum															

APPENDIX 8. Continued.

MONTH: October TRANSECT: North 1

Taxa	3 meters $\bar{X}$	3 meters S.E.	3 meters %	6 meters $\bar{X}$	6 meters S.E.	6 meters %	9 meters $\bar{X}$	9 meters S.E.	9 meters %	12 meters $\bar{X}$	12 meters S.E.	12 meters %	15 meters $\bar{X}$	15 meters S.E.	15 meters %
Total Gastropoda							20	20		20	20		141	73	
Valvata sincera										20	20	100.0	141	73	100.0
Valvata sp.															
Amnicola sp.															
Bythinia tentaculata															
Lymnaea sp.							20	20	100.0						
Total Pelecypoda							162	73		343	314		1535	466	
Total *Pisidium*							162	73		343	314		1515	457	
Pisidium adamsi															
Pisidium casertanum							20	20	12.3	162	162	47.2	323	81	21.3
Pisidium compressum															
Pisidium conventus															
Pisidium fallax										20	20	5.8	121	61	8.0
Pisidium henslowanum										20	20	5.8	162	53	10.7
Pisidium lilljeborgi							20	20	12.3						
Pisidium nitidum f. *nitidum*							61		37.6	61	61	17.8	545	299	36.0
Pisidium nitidum f. *pauperculum*							40	40	24.7				20	20	1.3
Pisidium supinum															
Pisidium variabile										20	20	5.8	20	20	1.3
Pisidium walkeri															
Pisidium spp.							20	20	12.3	61	35	17.8	323	132	21.3
Total *Sphaerium*													20	20	
Sphaerium nitidum															
Sphaerium striatinum													20	20	100.0
Sphaerium transversum															

APPENDIX 8. Continued.

MONTH: October TRANSECT: South 1

Taxa	3 meters			6 meters			9 meters			12 meters			15 meters		
	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Gastropoda							61	61		61	61		465	53	
Valvata sincera							40	40	65.6	40	40	65.6	465	53	100.0
Valvata sp.															
Amnicola sp.															
Bythinia tentaculata															
Lymnaea sp.							20	20	32.8	20	20	32.8			
Total Pelecypoda							222	53		404	267		323	179	
Total *Pisidium*							222	53		404	267		303	160	
Pisidium adamsi										40	40	9.9			
Pisidium casertanum										61	61	15.1	20	20	6.6
Pisidium compressum													40	40	13.2
Pisidium conventus							20	20	9.0	20	20	4.9	20	20	6.6
Pisidium fallax							20	20	9.0	61	61	15.1			
Pisidium henslowanum							40	40	18.0	40	40	9.9			
Pisidium lilljeborgi															
Pisidium nitidum f. *nitidum*							141	20	63.5	101	53	25.0	121	61	39.9
Pisidium nitidum f. *pauperculum*										20	20	4.9	20	20	6.6
Pisidium supinum															
Pisidium variabile										20	20	4.9			
Pisidium walkeri															
Pisidium spp.										40	40	9.9	81	40	26.7
Total *Sphaerium*													20	20	
Sphaerium nitidum															
Sphaerium striatinum													20	20	100.0
Sphaerium transversum															

APPENDIX 8. Continued.

MONTH: October TRANSECT: North 2

Taxa	3 meters			6 meters			9 meters			12 meters			15 meters		
	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Gastropoda													101	101	
Valvata sincera													81	81	80.2
Valvata sp.															
Amnicola sp.															
Bythinia tentaculata													20	20	19.8
Lymnaea sp.															
Total Pelecypoda							141	112		566	202		1798	618	
Total _Pisidium_							101	73		566	202		1757	578	
Pisidium adamsi															
Pisidium casertanum							20	20	19.8	101	53	17.8	465	179	26.5
Pisidium compressum															
Pisidium conventus													61	35	3.5
Pisidium fallax							40	40	39.6	81	53	14.3	263	107	15.0
Pisidium henslowanum										101	53	17.8	384	141	21.9
Pisidium lilljeborgi													20	20	1.1
Pisidium nitidum f. _nitidum_							20	20	19.8	162	53	28.6	303	152	17.2
Pisidium nitidum f. _pauperculum_										20	20	3.5	20	20	1.1
Pisidium supinum															
Pisidium variabile													61	61	3.5
Pisidium walkeri													61	61	3.5
Pisidium spp.							20	20	19.8	101	40	17.8	121	93	6.9
Total _Sphaerium_							40	40					40	40	
Sphaerium nitidum															
Sphaerium striatinum													20	20	50.0
Sphaerium transversum							40	40	100.0				20	20	50.0

APPENDIX 8. Continued.

MONTH: October TRANSECT: South 2

Taxa	3 meters			6 meters			9 meters			12 meters			15 meters		
	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%	$\overline{X}$	S.E.	%
Total Gastropoda										20	20				
Valvata sincera										20	20	100.0			
Valvata sp.															
Amnicola sp.															
Bythinia tentaculata															
Lymnaea sp.															
Total Pelecypoda							242	140		222	123		101	40	
Total *Pisidium*							222	123		222	123		101	40	
Pisidium adamsi															
Pisidium casertanum							101	73	45.5				20	20	19.8
Pisidium compressum										40	40	18.0			
Pisidium conventus															
Pisidium fallax							61	61	27.5				20	20	19.8
Pisidium henslowanum										61	35	27.5	20	20	19.8
Pisidium lilljeborgi															
Pisidium nitidum f. *nitidum*							40	40	18.0	81	53	36.5			
Pisidium nitidum f. *pauperculum*										40	40	18.0	20	20	19.8
Pisidium supinum															
Pisidium variabile													20	20	19.8
Pisidium walkeri															
Pisidium spp.							20	20	9.0						
Total *Sphaerium*							20	20							
Sphaerium nitidum															
Sphaerium striatinum															
Sphaerium transversum							20	20	100.0						

APPENDIX 8. Continued.

MONTH: October TRANSECT: North 3

Taxa	3 meters $\bar{X}$	3 meters S.E.	3 meters %	6 meters $\bar{X}$	6 meters S.E.	6 meters %	9 meters $\bar{X}$	9 meters S.E.	9 meters %	12 meters $\bar{X}$	12 meters S.E.	12 meters %	15 meters $\bar{X}$	15 meters S.E.	15 meters %
Total Gastropoda										40	40		101	73	
Valvata sincera										20	20	50.0	101	73	100.0
Valvata sp.															
Amnicola sp.															
Bythinia tentaculata															
Lymnaea sp.										20	20	50.0			
Total Pelecypoda							202	112		343	179		1454	337	
Total Pisidium							162	132		343	179		1454	337	
Pisidium adamsi															
Pisidium casertanum										61	61	17.8	283	40	19.5
Pisidium compressum															
Pisidium conventus							20	20	12.3	20	20	5.8	61	35	4.2
Pisidium fallax							40	40	24.7	61	61	17.8	141	40	9.7
Pisidium henslowanum							61	61	37.6				242	126	16.6
Pisidium lilljeborgi													81	53	5.6
Pisidium nitidum f. nitidum							40	20	24.7	141	73	41.1	465	199	32.0
Pisidium nitidum f. pauperculum													20	20	1.4
Pisidium supinum															
Pisidium variabile															
Pisidium walkeri															
Pisidium spp.										61	61	17.8	162	40	11.1
Total Sphaerium							40	40							
Sphaerium nitidum							40	40	100.0						
Sphaerium striatinum															
Sphaerium transversum															

APPENDIX 8. Continued.

MONTH: October TRANSECT: South 3

Taxa	3 meters $\bar{X}$	3 meters S.E.	3 meters %	6 meters $\bar{X}$	6 meters S.E.	6 meters %	9 meters $\bar{X}$	9 meters S.E.	9 meters %	12 meters $\bar{X}$	12 meters S.E.	12 meters %	15 meters $\bar{X}$	15 meters S.E.	15 meters %
Total Gastropoda										101	40		81	81	
Valvata sincera													81	81	100.0
Valvata sp.															
Amnicola sp.										61		60.4			
Bythinia tentaculata										40	40	39.6			
Lymnaea sp.															
Total Pelecypoda							81	40		121	121		101	40	
Total *Pisidium*							81	40		121	121		101	40	
Pisidium adamsi															
Pisidium casertanum										20	20	16.5			
Pisidium compressum															
Pisidium conventus							20	20	24.7						
Pisidium fallax							20	20	24.7				20	20	19.8
Pisidium henslowanum							20	20	24.7				20	20	19.8
Pisidium lilljeborgi															
Pisidium nitidum f. *nitidum*							20	20	24.7	61	61	50.4	61	35	60.4
Pisidium nitidum f. *pauperculum*															
Pisidium supinum															
Pisidium variabile															
Pisidium walkeri															
Pisidium spp.										40	40	33.1			
Total *Sphaerium*															
Sphaerium nitidum															
Sphaerium striatinum															
Sphaerium transversum															